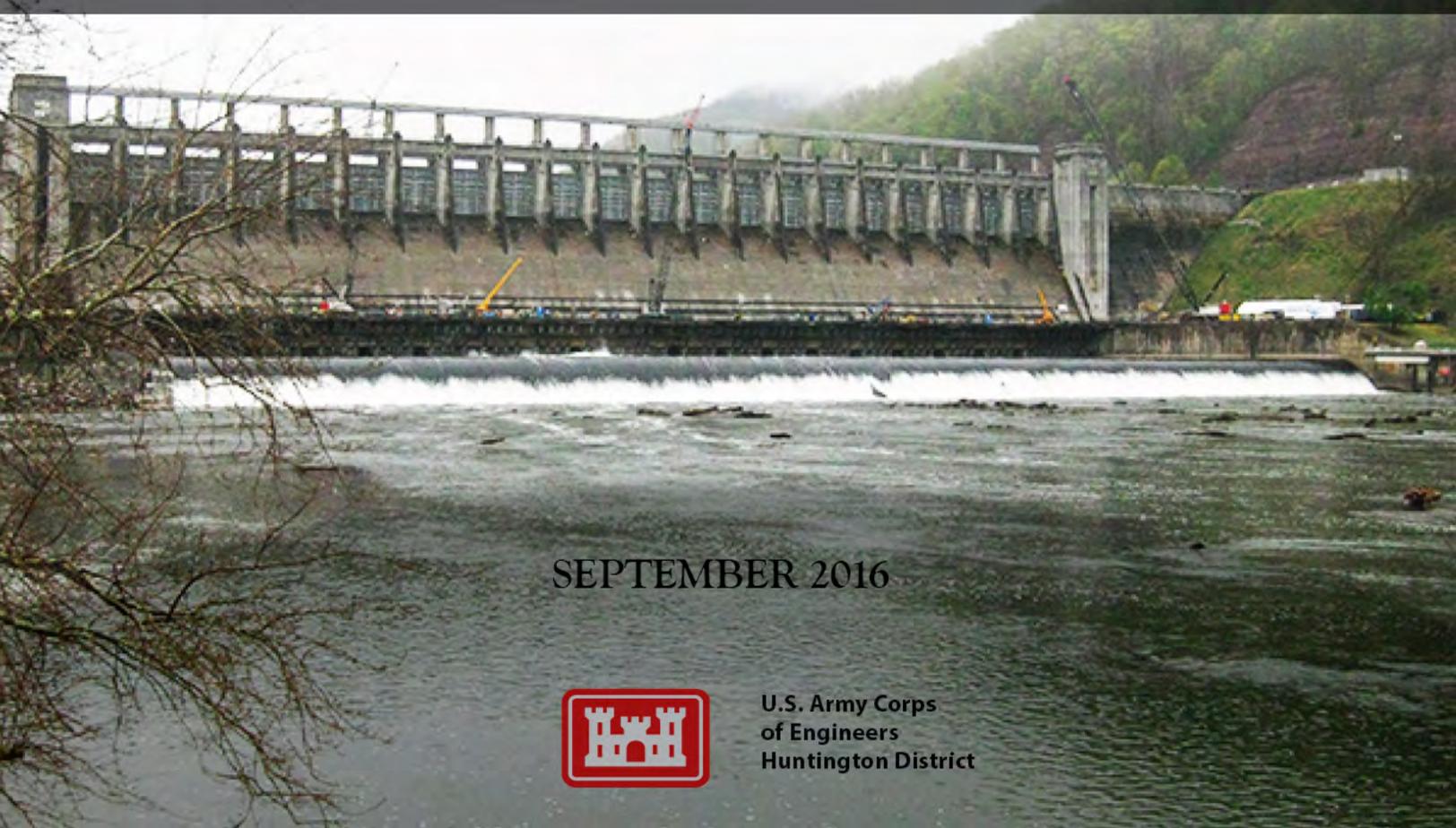




SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT
BLUESTONE DAM SAFETY MODIFICATION

HINTON, WEST VIRGINIA

VOLUME III: APPENDICES H through L



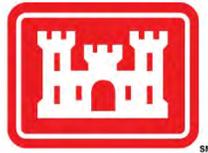
SEPTEMBER 2016



U.S. Army Corps
of Engineers
Huntington District

Volume III: Appendices H through L

**Supplemental Draft Environmental
Impact Statement,
Bluestone Dam Safety Modification,
Hinton, West Virginia**



**U.S. Army Corps of Engineers
Huntington District
Huntington, West Virginia**

September 2016

Appendix H

USFWS DOCUMENTS



United States Department of the Interior



FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

March 28, 2014

Ms. Amy K. Frantz
Chief, Planning Branch
U.S. Army Corps of Engineers
Huntington District
502 Eighth Street
Huntington, West Virginia 25701

Re: Fish and Wildlife Coordination Act Planning Aid Letter (PAL) on the Bluestone Dam Safety Project in Summers County, West Virginia

Dear Ms. Frantz:

This constitutes the Fish and Wildlife Coordination Act Planning Aid Letter (PAL) on the Bluestone Dam Safety Project in Summers County, West Virginia. Currently the U.S. Army Corps of Engineers Huntington District (Corps) is studying the feasibility of modifying Bluestone Dam in order to meet U.S. Army Corps of Engineers Tolerable Risk Guidelines. This PAL provides information on the fish and wildlife resources within the project site and reconnaissance areas, as well as a preliminary assessment of potential biological impacts of the proposed modification of the dam and associated habitats. This PAL is intended to assist the Corps in subsequent project planning and has been prepared in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). This PAL is being provided under the terms of the April 2013 Scope of Services Agreement between the Corps and the West Virginia Field Office of the U.S. Fish and Wildlife Service (Service). The draft PAL was submitted to the Corps on February 6, 2014.

As further detailed in the PAL, the tailwaters of the Bluestone Dam have been designated as Resource Category 1 habitat, which according to the Service's Mitigation Policy are of high value for evaluation species and are unique and irreplaceable on a national basis or in the ecoregion; therefore there should be no loss of existing habitat value (USFWS Mitigation Policy-46 FR 7656). The tailwaters have numerous fish nursery areas in vegetated shallows of water willow, abundant fish food sources, and ample places for fish to seek shelter behind large rocks. Such high value riverine habitats are relatively scarce in the ecoregion. Our analysis of the tailwater area below Bluestone Dam has determined that the area is of high quality for the riverine evaluation species. Because these one-of-a-kind areas cannot be replaced, we recommend avoiding all losses of existing Resource Category 1 habitat from any measures

Ms. Amy K. Frantz
March 28, 2014

associated with the proposed modifications of Bluestone Dam and associated lands and waters. The remote conventional stilling basin alternative will have permanent impacts to this Category I resource and these adverse impacts are not mitigatable so this alternative should only be considered if all other avoidance alternatives are not practicable. The Service would support the selection of the least environmentally damaging measures, which are those that occur within the original footprint and do not require coffer cells downstream of the stilling basin. The measures that would avoid adverse impacts to Resources Category 1 areas are the flip bucket, parapet wall, concrete overlay of exposed rock in stilling basin, and modifying the existing stilling basin with super baffles (within the original footprint).

We look forward to opportunities for continued involvement as the study progresses into the alternative plan evaluation stage, at which time we will provide more specific recommendations for minimizing and mitigating impacts. If you have any questions regarding this PAL, please contact Tiernan Lennon of my staff at telephone (304) 636-6586, Extension 12, or Tiernan_Lennon@fws.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Schmidt". The signature is fluid and cursive, with a large initial "J" and "S".

John E. Schmidt
Field Supervisor

Ms. Amy K. Frantz
March 28, 2014

cc:

Project File

Reader File

WVDNR – Danny Bennett

ES:WVFO:TLennon:skd:3/28/2014

Filename: P:\Finalized Correspondence\Corps of Engineers\Bluestone Dam Safety Project\PAL
Transmittal Letter.docx

FINAL
PLANNING AID LETTER
BLUESTONE DAM SAFETY PROJECT
March 2014

U.S. Fish and Wildlife Service
West Virginia Field Office
Elkins, West Virginia

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I. Overview

The purpose of this PAL is to: 1) describe the current baseline condition of fish, wildlife, and plant resources in the study area; 2) identify high value resources and habitats; 3) provide a preliminary analysis of the effects of the proposed measures to modify the dam; and 4) provide preliminary recommendations on avoidance, minimization, and mitigation measures.

The Service previously prepared planning aid reports for various projects at this site addressing fish and wildlife resources. These include a report completed in April 1978 entitled “Preliminary report of fish and wildlife resources associated with alternative reservoir complex location “G” of the Kanawha authorization study and the Gauley River hydropower authorization study”; a report in August 1979 entitled “Preliminary habitat evaluation report of the proposed Bluestone pumped storage project, location “G” of the Kanawha authorization study”; Fish and Wildlife Coordination Act reports in 1978 and 1998; and a Planning Aid Report for the dam safety project in November 1996. This PAL updates and expands upon previous Fish and Wildlife Coordination Act reports and Planning Aid reports prepared by the Service. These previous reports presented the results of literature searches, field surveys, and habitat evaluation procedures conducted in the study area by the Service, and discussed water quality and important habitat areas.

In preparing this PAL, we also conducted a general site reconnaissance of the planning area, reviewed maps and aerial photos, conducted a literature review, and conducted a preliminary Habitat Evaluation Procedures (HEP) assessment of existing riverine and riparian resources in the area immediately downstream of the dam. Our preliminary HEP report was prepared during October 2013 as a separate document and is incorporated by reference (Service 2013).

II. Project Description

Bluestone Dam and reservoir were authorized for the purposes of flood control and power development by Executive Order 7183-A in September 1935 and by the Flood Control Acts of 1936 and 1938. The stated project purposes were later expanded to include recreation activities under the Flood Control Act of 1944, and fish and wildlife enhancement under the Fish and Wildlife Coordination Act of 1958. To address the accumulation and disposal of drift at the project, the original project authorization was further modified under the Water Resource Development Act of 1992, as amended in 1996.

Construction of the dam began in January 1942 and continued until March 1944, when it was stopped for the duration of World War II. Construction resumed from 1946 to 1948 and the dam began operation in 1949. While the original plans for Bluestone Dam called for hydropower development, extensive electric power development during the war resulted in a decision to defer hydropower development at the project and use all available storage for flood control. This lowered the summer pool elevation of the lake 80 feet from 1490 to 1410 feet above mean sea level (msl).

The Bluestone Dam is a linear concrete gravity structure with an overall length of 2,060 feet and maximum height of 165 feet above the streambed. Discharge capacity of the existing structure consists of gated sluices and a gated auxiliary spillway. That spillway is 790 feet long and includes 21 bays with vertical lift gates and a stilling basin consisting of natural bedrock .

Operation of the reservoir is by 16 gated sluices with a total capacity of approximately 70,000 cubic feet per second (cfs). The total design discharge capacity of the dam is 430,000 cfs. When the dam was planned in the 1930's, this discharge capacity was based upon a hypothetical flood created by shifting the center of the July 1916 hurricane storm to the New River drainage basin.

Following construction of the dam, a subsequent Corps risk assessment showed potential safety hazards in light of more current engineering standards. Consequently the Corps signed a Record of Decision in 1999 to modify Bluestone Dam as described in the Dam Safety Assurance Evaluation Report. The 1999 Record of Decision allowed the Corps to begin detailed design and subsequent construction of the recommended alternative which included: a 13-foot cantilever wall on top of the dam to prevent overtopping; an additional concrete monolith on the east abutment; a floodgate closure across West Virginia Route 20 at the west abutment; extension and retrofit of the existing hydropower penstocks with gates to supplement discharge capacity of the spillway and outlets; scour protection downstream of the penstocks; removable closures at each end of the spillway; and dam stability improvements. When completed, the current modifications under construction will strengthen the dam's stability through use of steel anchors and massive concrete thrust blocks, and allow for increased discharge capacity through the hydropower penstocks, substantially reducing risk during high flow events.

The Corps has determined that even with these most recent modifications, risk of dam failure and downstream scour remains in the event of a Probable Maximum Flood (PMF). Modeling and analysis by the Corps of recent precipitation estimates, coupled with detailed terrain, soil and runoff data, has shown that the PMF possible for the New River Basin has a peak flow of 1,086,000 cfs, which is double the peak of the original design flow (430,000 cfs). The Corps has concluded that under such high flow events, the downstream bedrock is vulnerable to erosion as a result of deficiencies with the current stilling basin configuration. According to the Corps, this potential erosion creates an unacceptable risk of dam failure and downstream scouring of the bedrock (Corps 2013b). While the probability of a flood of this magnitude is small¹, the consequences of dam failure and catastrophic flooding would put lives and property at risk from the dam all the way to the Ohio River, including: the New River Gorge National River; the Greenbrier, Gauley, Kanawha, and Elk Rivers; and the heavily populated and industrialized capital city of Charleston.

To reduce risk to acceptable levels, the Corps is now studying the feasibility of a wide array of additional structural modifications to the dam and river, as well as nonstructural measures (Corps 2013b). Potential structural measures include: modification of the stilling basin; additional modification of the six hydropower penstocks to supplement the discharge capacity; a parapet wall on top of the dam to prevent overtopping (as opposed to the 13-foot wall previously approved); modification of other dam components; construction of an auxiliary stilling basin; construction of an alternative auxiliary spillway; and scour protection of the spillway and downstream areas. Potential nonstructural measures include an improved flood warning and

¹ A PMF of 1,086,000 cfs is approximately equivalent to a 63,000- year flood event (A. Johnson, Corps, personal communication 2013). While such an event could occur in any year, the risk of such a flood happening in any year is one in 63,000 (e.g. an annual probability of 0.001 percent). Smaller floods, such as a 625-year flood event, also pose risk. There is a 1.6 percent annual probability that the dam will reach a pool that threatens the dam's stability (the Imminent Failure Flood elevation) (Corps 2013a).

evacuation system and operational measures to prevent overtopping. Multiple combinations of these measures may be needed. This PAL only addresses these additional structural modifications that are currently being evaluated.

III. Description of the Study Area

Bluestone Dam is located on the New River at the community of Bellepoint, in Summers County, West Virginia, approximately 2.5 miles downstream of the confluence of the New and Bluestone Rivers, and 0.8 miles upstream of the confluence of the New and Greenbrier Rivers (Figure 1). The study area includes the water and adjacent lands of the Bluestone Project (the dam, Bluestone Lake flood control reservoir, and adjacent Federal, State, and private lands), as well as portions of the New River and its tributaries (the Bluestone and Greenbrier Rivers), and the Kanawha River and its tributaries (the Gauley and Elk Rivers). This large study area encompasses a 4,565-square-mile drainage area extending along the New River from Bluff City, Virginia, to the junction of the Kanawha River with the Ohio River at Point Pleasant, West Virginia (Figure 1). Whereas only a small portion of the study area will be directly affected by project construction, the study area is large enough to encompass the area of potential direct, indirect, and cumulative effects of a Probable Maximum Flood event.

For planning purposes, the study area is subdivided into four reconnaissance areas: 1) Bluff City to Sandstone; 2) Sandstone to Gauley Bridge; 3) Gauley Bridge to Poca; and 4) Poca to Point Pleasant (Figure 1). Photographs of reconnaissance areas are in Appendix C. In this PAL, we discuss areas with comparable resource values together to reduce redundancy. Thus Areas 1 and 2 are discussed together, and Areas 3 and 4 are discussed together. Within Area 1, however, we distinguish resource values separately in the tailwater area directly below the dam because direct impacts of project construction are most likely to occur here.

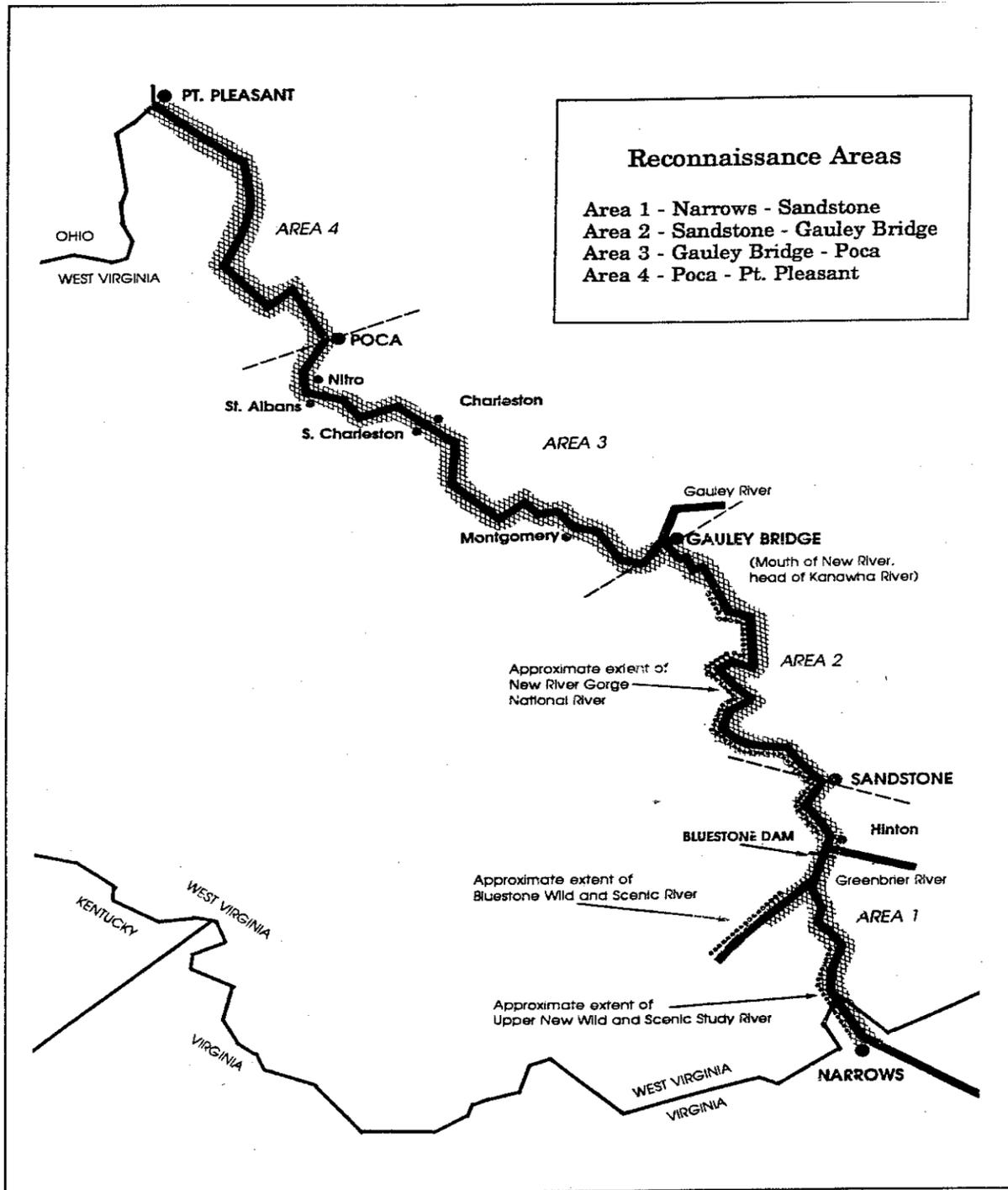


Figure 1. Map of the entire Bluestone Dam Project study area.

Reconnaissance Area 1 extends approximately 48 river miles from Bluff City, Virginia to Sandstone, West Virginia (Figure 1). It includes the Bluestone Dam and reservoir, Bluestone National Scenic River, the Upper New River Wild and Scenic Study River, Bluestone Lake Wildlife Management Area, and portions of Bluestone State Park, Pipestem State Park, and the New River Gorge National River. The communities present in Area 1 are Narrows, Rich Creek and Glen Lyn, Virginia, as well as to Hinton, West Virginia (Corps 1997).

Along the undeveloped 30-mile span of the New River from Glen Lyn, Virginia to the Bluestone Dam, the terrain is rather steep but there are some isolated floodplains. The stretch of the New River, between the dam and Hinton, is mostly developed floodplain with highways located near both rivers (Corps 1997).

Reconnaissance Area 2 extends approximately 54 river miles from Sandstone to Gauley Bridge, West Virginia (Figure 1). This area along the New River is dominated by steep cliffs and largely uninhabitable lands. The impact zone for Area 2 lies mostly within the floodplain boundaries or valley floor of the New River Gorge National River. Because of the steep terrain in this Reconnaissance Area, the floodplains are limited to narrow river valleys. This area is largely undeveloped and lower portions of the New River Gorge National River, Babcock, and Hawk's Nest State Parks are located in the floodplain (Corps 1997). There are no large communities along the New River in Reconnaissance Area 2, except for a very limited area along the eastern bank at Sandstone. The communities present in Area 2 are Meadow Creek, Ansted, and the historic town of Thurmond (Corps 1997).

Reconnaissance Area 3 extends 57 river miles from Gauley Bridge to Poca, West Virginia. A large portion of this area is made up of the heavily industrialized Kanawha River Valley (Figure 1). The Kanawha River flows through a narrow valley until it reaches the city of Malden where developed floodplains are present. This reach of the Kanawha River through the narrow valley includes the cities and towns of Glen Ferris, Boomer, Smithers, Montgomery, Cedar Grove, Chelyan, Chesapeake, Belle, and Marmet. Downstream of Marmet, the development becomes denser along the wide floodplains of the river. The towns and cities present in this heavily developed section include Rand, Malden, Charleston, South Charleston, Dunbar, Institute, St. Albans, Nitro, and Poca. The impact zone for Area 3 includes portions of most of these towns and cities. The major type of industry in Area 3 is chemical manufacturing and processing, with more than a dozen chemical plants in the impact zone (Corps 1997).

Reconnaissance Area 4 extends 39 river miles from Poca to Point Pleasant, West Virginia, where the Kanawha River joins the Ohio River (Figure 1). The valley in Area 4 is not as narrow as in Areas 1 and 2, and this stretch of the river is more rural with development more widely scattered than in Reconnaissance Area 3. The towns in Area 4 partially located in the impact zone are Winfield, Buffalo, and Point Pleasant (Corps 1997).

IV. Fish and Wildlife Resources in the Study Area

The habitats within many portions of the study area are of high quality. The intricate water system that comprises the Kanawha River Basin and Bluestone River Basin contains a great diversity of quality fish and wildlife habitats (Service 1996). Reports completed by the Service in the late 1970's provide indication of the quality and value of these habitats at that time (Service 1996).

In general, since the 1970s there have been improvements in water quality and a limited increase in development and land uses due to increasing human population. The counties along the New and Bluestone Rivers have sparse development, and are limited by terrain and by their designation within national recreation areas. According to the 2006 National Land Cover Data Set, developed land has increased moderately since 1992 in areas that were already previously developed, when compared to the 2006 data set.

In this PAL we supplement previous PALs with more recent studies of the quality and value of fish, wildlife, and plant resources in the study area.

A. Reconnaissance Areas 1 and 2

Within Reconnaissance Areas 1 and 2, the Bluestone Lake Wildlife Management Area, Bluestone National Scenic River, and New River Gorge National River are important resources. The Bluestone Lake Wildlife Management Area is the second largest public facility of its kind (18,019 acres) in West Virginia. Along with the excellent warmwater fishery, these State and Federal public lands provide scenic beauty, support diverse and unique plant and animal populations, and provide a variety of high quality boating, white-water rafting and kayaking, sport hunting, trapping, non-game viewing, and other recreation opportunities. Important game and furbearers in the area include black bear (*Ursa americanus*), white-tailed deer (*Odocoileus virginianus*), ruffed grouse (*Bonasa umbellus*), wild turkey (*Meleagris gallopavo*), fox and gray squirrels (*Sciuris niger* and *S. griseus*) bobcat (*Lynx rufus*), red and gray fox (*Vulpes fulva*, *Urocyon cinereoargenteus*) mink (*Mustela vison*), muskrat (*Ondatra zibethica*), cottontail rabbit (*Sylvilagus transitionalis*), and raccoon (*Procyon lotor*). Important fish and wildlife resources in Reconnaissance Areas 1 and 2 include riverine, reservoir, riparian, wetland, and upland forest habitats; special status species (includes federally listed species and species proposed for listing as Threatened or Endangered, Candidate, or Species of Concern); and species in greatest need of conservation as identified by the West Virginia Division of Natural Resources (WVDNR) (aquatic and terrestrial wildlife species with small or declining populations or other characteristics that make them vulnerable) (WVDNR 2005).

1. Riverine Resources

Portions of the Bluestone, New, and Greenbrier Rivers occur within Reconnaissance Area 1 comprising the New River Basin. The WVDNR lists many of the streams and rivers in the New and Bluestone Rivers, including their tributaries, as high quality streams because of their unique and ecologically valuable aquatic and terrestrial habitats (Service 1996). Within Areas 1 and 2, an approximately 10.5-mile stretch of the Bluestone River, beginning approximately 2 miles upstream of the Summers and Mercer County line and extending downstream to the maximum summer pool elevation (1410 feet) of Bluestone Lake, and a 53-mile stretch of the New River from Hinton to Gauley Bridge are designated as national wild and scenic rivers, having met certain criteria for free-flowing stretches of river and outstandingly remarkable resource values (National

Park Service (NPS) 2009). The wild and scenic river designations are unique in the ecoregion, and provide stretches of river free of impoundments with shorelines or watersheds that are still largely primitive and undeveloped, but accessible. There are no dams on the Bluestone River, whereas the New River is free-flowing between two dams (Bluestone and Hawk's Nest).

Fish

The New River Basin supports one of the largest and most valuable warmwater stream fisheries in West Virginia due to a good pool-riffle geomorphic structure, abundant cover, and adequate water quality (Mahan 2004). The reach of the New River in Reconnaissance Area 1 supports an excellent warmwater fishery of smallmouth bass (*Micropterus dolomieu*), spotted bass (*M. punctulatus*), rock bass (*Ambloplites rupestris*), channel catfish (*Ictalurus punctatus*), and flathead catfish (*Pylodictis olivaris*) (Corps 2004). In particular, the stretch of river from the tailwaters near Hinton to Sandstone Falls is one of the most popular and accessible fishing areas in West Virginia, known locally as the "Miracle Mile" (Buhlmann 1990; Mark Scott, WVDNR, personal communication 2013). Near optimum fish habitat below the reservoir in the New River is created by cool water releases from the bottom of the dam, in combination with run, riffle, and pool habitats, and abundant macro-invertebrate populations. The volume and gradient of the New River Gorge allows for many cross sections of the river to contain all three of these habitat types.

The New River Gorge is over 1,200 feet deep, averages 1.3 miles wide at 7 cross-sections, and has an average stream gradient of about 13 feet per mile over its entire course (Purvis *et al.* 2002, Mahan 2004). The entire river has important fish spawning, rearing, and adult migration habitat due to its size, geomorphic variety, ledge drops, pools, runs, side eddies, islands, backwaters, large woody debris, forested bank cover, and suitable spawning substrate (NPS 2009). Instream wetlands, consisting of numerous emergent water willow (*Justicia americana*), star-grass (*Heteranthera dubia*), and pondweed (*Potamogeton sp.*) populations, also occupy the shallow water areas around forested islands, shorelines, and riffles (NPS 2009). The diversity of living organisms associated with these shallow areas provides excellent feeding, spawning, resting, and nursery habitats for fish.

Different species of fish occupy different microhabitats in the New River. Five habitat-use guilds have been identified for fish in the New River Gorge National River (as summarized by Purvis *et al.* 2002). The edge-pool guild includes bluntnose minnow (*Pimephales notatus*), logperch (*Percina caprodes*), young-of-year (YOY) and juvenile northern hog sucker (*Moxostoma macrolepidotum*), small-sized white and striped shiners (*Luxilus albeolus*, *L. chrysocephalus*), white crappie (*Pomoxis annularis*), and all sizes of spotted bass and sunfish (*Lepomis sp.*), and mimic, spottail, and spotfin shiner (*Notropis volucellus*, *N. hudsonius*, *N. spilopterus*). The middle-pool guild includes common carp (*Cyprinus carpio*), adult flathead catfish, channel catfish, and muskellunge (*Esox masquinongy*). The riffle guild includes adult bigmouth chub (*Nocomis platyrhynchus*), rainbow and sharpnose darters (*Etheostoma caeruleum*, *Percina oxyrhynchus*), YOY

flathead catfish, telescope shiner (*Notropis telescopus*), rosyface shiner (*N. rubellus*), and large white and striped shiners. The edge-channel guild includes YOY smallmouth bass, greenside and Roanoke darters (*Etheostoma blennioides*, *Percina roanoka*), central stonerollers (*Campostoma anomalum*), and YOY bigmouth chub (*Nocomis platyrhynchus*). The generalist guild includes juvenile and adult smallmouth bass, and all sizes of rock bass.

Similar to the New River, the Bluestone River Gorge is deeply incised. At three cross sections it averages about 0.9 miles wide and over 760 feet deep (Purvis *et al.* 2002). The average gradient of the Bluestone River over its entire course is 27 feet per mile (Purvis *et al.* 2002). The Bluestone River has similar fish species composition as the New River, including popular game fish such as smallmouth bass, rock bass, bluegill (*Lepomis macrochirus*), and catfish (NPS 2009).

Both the Bluestone and New River drainages have a native fish fauna that is distinct from those of the rest of the Ohio River system (Jenkins and Burkhead 1994). This unique native fauna is composed of relatively few species compared to adjacent rivers, but with a high proportion of the native species being endemic with their native range restricted to a certain geographic area (NPS 2009). The uniqueness of the fauna is attributable to the relative long-term isolation of the New River system from adjacent river systems.

A major factor isolating the New River from other drainages is the 25 feet high Kanawha Falls. These falls are located approximately two miles below the confluence of the New and Gauley Rivers. While the name of the river does not change from New to Kanawha until the confluence, for ecological purposes Kanawha Falls serve as the boundary between the New and Kanawha Rivers. Kanawha Falls have been a significant, although not complete, barrier to upstream migration of fishes since the period of Pleistocene glaciation (Purvis *et al.* 2002).

The native fish fauna of the Bluestone and New Rivers have been adversely affected in more recent times by the introduction of nonnative fishes. Nonnative fishes make up approximately one-half of the New River fish fauna (Welsh *et al.* 2006). Introduced species are successful in the New and Bluestone Rivers because of high resource availability, low species richness, water chemistry, and productivity (Welsh *et al.* 2006). While valuable to the recreational fishery, nonnative species can have various impacts on native species through habitat alterations, disease/parasite introductions, hybridization, trophic alterations, and spatial alterations (Wellman 2004).

An electrofishing survey conducted by the Corps in 2004 immediately downstream of the dam, in the project area, found equal numbers of native and non-native fish species (Corps 2004). The native species found were channel catfish, logperch, sharpnose darter, greenside darter, longnose dace (*Rhinichthys cataractae*), Northern hogsucker (*Hypentelium nigricans*), central stoneroller, rosyface shiner (*Notropis rubellus*), spotfin shiner, white shiner, bigmouth chub, and flathead catfish. The nonnative species found were rock bass, bluegill, smallmouth bass, spotted bass, largemouth bass (*Micropterus*

salmoides), white crappie (*Pomoxis annularis*), rainbow darter, brook silverside (*Labidesthes sicculus*), redbreast sunfish (*Lepomis auritus*), telescope shiner, margined madtom (*Noturus insignis*), and Roanoke darter.

Mussels

Native mussels are an important part of the benthic community. Although there are abundant mussel fauna in the New River Gorge National River, the population is relatively low in diversity (eight species) when compared to the diversity of mussels (36 species) found in the Kanawha River (NPS 2009). Some of the same barriers that prevented fish migration also may have prevented mussel migration. Also, mussels require specific fish hosts to complete their life cycle; hence, the relatively low fish species diversity of the New River may contribute to the low diversity of mussels.

Seven species of live mussels, and shells of an eighth, were collected in New River Gorge National River during a 1984-85 study (Jirka and Neves 1987). Mussels were much more common towards the upstream end of the park, decreasing significantly below Glade Creek. No living or dead mussels were found in the lower eight miles of river within the park. The majority of mussel beds sampled were found on gravel, cobble, and sometimes sandy substrates, and often contained aquatic plants (macrophytes).

Mucket (*Actinonaias carinata*) was by far the most common species found by Jirka and Neves (1987). It composed over 90 percent of the individuals collected, and occurred in all areas where mussels were found. Purple wartyback (*Cyclonaias tuberculata*) and spike (*Elliptio dilatata*) were next most common, comprising approximately four and two percent, respectively, of the mussel fauna. These species were also present in all mussel beds. Buckhorn, or pistol-grip, (*Tritogonia verrucosa*) were relatively common (~2 percent of the fauna) above Sandstone Falls, but much less common below this point. Elktoe (*Alasmodonta marginata*), wavy-rayed lampmussel, (*Lampsilis fasciola*), and pocketbook (*Lam. ovata*) were collected in very small numbers. Shells of wavy-rayed lampmussel and pocketbook were collected in many mussel beds where no live individuals of these species were found. Shells of green floater (*Lasmigona subviridis*) were also collected during the survey.

Several other mussels have been collected or reported from the New River Gorge area. Empty valves of giant floater (*Anodonta grandis*) have been found immediately below Bluestone Dam and near the lower end of Brooks Falls (Jirka and Neves 1987). Lilliput (*Toxolasma parvus*) has been collected in the lower New River only near the mouth of the Gauley River (Jirka and Neves 1987). A single specimen of rainbow (*Villosa iris*) was reported from Bluestone River (Tolin 1985). Mapleleaf (*Quadrula quadrula*) was reported from Sandstone Falls in 1970 (Bates 1979). In 2002 a single live mapleleaf was positively identified from the New River in the Stonecliff area and was identified again in 2007 within the New River Gorge National River (Taylor *et al.* 2007).

A recent mussel survey of the tailwaters by the Corps located only two mussel species immediately downstream of Bluestone Dam, the pistolgrip (*Tritogonia verrucosa*) (8

individuals) and purple wartyback (*Cyclonaias tuberculata*) (2 individuals) (Corps 2011). In addition to natural barriers to fish host migration in the New River, altered geomorphic structure in the tailwaters could contribute to the depauperate mussel resources in this area. Since the Bluestone Dam was originally constructed, changes in flow dynamics may have had adverse effects on the physical and biological attributes of the New River. Decreases in the extent and frequency of flood events have altered riparian and instream vegetation, as well as the location and composition of gravel bars in the river. In particular, changes in flow dynamics and important gravel bar habitat may have adversely affected mussel communities (Mahan 2004).

An exotic bivalve mollusk, the Asiatic clam (*Corbicula fluminea*), has become well established in New River since at least 1975 (Rogers *et al.* 1979). Population numbers, biomass, and production of this mollusk probably greatly exceed those of all native mussels. Unlike most native mussels in the family Unionidae, *Corbicula* have ciliated, free-swimming larvae and do not require a specific fish host to complete their life cycle (Pennak 1989).

Another invasive exotic, the zebra mussel (*Dreissena polymorpha*) is known to occur in West Virginia but has not yet been reported in the New River. This exotic species was first found in West Virginia in the Ohio River in 1999 (Purvis *et al.* 2002). Although not yet known from the New River, zebra mussels are now well established in Kanawha River and could easily be introduced to heavily boated Bluestone Lake at any time (Mark Scott, WVDNR, personal communication 2013). Boats that have been anchored more than a day or two in zebra mussel-infested waters may carry “hitchhiking” mussels attached to their hulls, engines, and anchor chains.

Crayfish

Seven species of crayfish are known from the New River Gorge (Purvis *et al.* 2002). Of these, five species are widespread (to differing degrees) in the New River Gorge area, Sanborn’s crayfish (*Orconectes s. sanbornii*), Northern crayfish (*O. virilis*), Coosa River spiny crayfish (*O. spinosus*), *Cambarus bartonii carinirostris* (no common name available), and Teays River Crayfish (*C. sciotensis*) (Jezerinac *et al.* 1995). A sixth species, the Allegheny crayfish (*O. obscurus*) has also been collected from New River (Markham *et al.* 1980). *C. b. carinirostris* is known from Bluestone River. The Appalachian brook crayfish (*Cambarus bartonii cavatus*) is listed as rare upstream from Kanawha Falls, and is found primarily above 1500 feet of elevation. The three *Cambarus* species, Sanborn’s crayfish, and the Allegheny crayfish are considered native. The Northern crayfish and the Coosa River spiny crayfish are non-native. The New River crayfish (*Cambarus chasmodactylus*) is found in the same watershed and has the potential to be present in Reconnaissance Area 1.

Historically, Northern crayfish individuals were introduced into Bluestone Lake as forage when the reservoir fishery was newly created after the dam began operation (Swecker 2012). They are now abundant in the New River below the dam and appear to be displacing native crayfish populations (Swecker 2012). Non-native crayfish were likely

introduced below the dam by anglers as discarded or escaped bait. Crayfish are a large part of a significant bait fishery that exists in the New River between Bluestone Dam and Sandstone Falls (Purvis *et al.* 2002).

Crayfish are an important food source for smallmouth bass, aquatic salamanders, as well as many birds, mammals, and reptiles. They are considered a keystone species that play a vital role in breaking down organic matter in lakes, streams, and rivers (Swecker 2012).

Benthic Macroinvertebrates

Monitoring by the NPS for invertebrates in the New River indicates that aquatic invertebrate abundance is highest directly below Bluestone Dam and decreases downstream. The macroinvertebrate community is most diverse at Sandstone Falls.

At least 12 families of invertebrates occur below Bluestone Dam (Purvis *et al.* 2002). Two families, Hydropsychidae (net-spinning caddisflies) and Chironomidae (midges) together accounted for almost 90 percent of the community. The Sandstone Falls community was more balanced with a greater variety of families than at any other site. Usually, seven families accounted for more than one percent of the community. Hydropsychidae (30 percent) were most abundant. Midges (10 percent) were much less abundant than at Bluestone Dam. Three mayfly families (Oligoneuriidae, Baetidae, and Ephemerellidae) together comprised about 40 percent of the community. Also present in substantial numbers were riffle beetles (Elmidae) and gill breathing snails (Pleuroceridae). Fourteen invertebrate families were collected at Thurmond. Baetidae (50 percent), midges (15 percent), and Pleuroceridae (10 percent) were most abundant. Fayette Station had the lowest taxa richness (8 families) of the five sites. Heptageniid mayflies (25 percent), Elmidae (25 percent), and midges (20 percent) were most abundant.

Hellgrammites (*Megaloptera sp.*) are relatively large aquatic macroinvertebrates that provide food for game fish and bait for anglers and support a recreational and commercial bait fishery in and around the New River Gorge National River (NPS 2009).

Black flies (Simuliidae) also are found throughout the New River, with the primary breeding area in the stretch between Hinton and Meadow Creek (NPS 2009). While black flies are an important food source for foraging fish, including smallmouth bass, they are bothersome to people. It is unknown to what degree the current practice in the gorge of aerial application of *Bti*, a bacterial insecticide, to kill black flies, is having on the fish prey base.

Water Quality

The mainstem of the New River in Reconnaissance Areas 1 and 2 is not currently listed as impaired on the State 303(d) list of impaired streams; however, some of its smaller tributary streams are listed as impaired due to poor biological integrity, or have issues with pH, fecal coliform, polychlorinated biphenyls (PCBs), iron, and selenium ((West

Virginia Department of Environmental Protection (WVDEP) 2012)). The Bluestone River is listed as impaired for its entire length for PCBs and has biological integrity issues from river mile 44.9 to the headwaters (WVDEP 2012). Human practices such as coal mining, domestic waste, logging, agriculture, industrial activities, urbanization, and oil/gas extraction have influenced water quality throughout the New River basin (Wellman 2004). The National Park Service's water quality management plan for the Bluestone Scenic River and the New River Gorge National River identified improper sewage disposal within and outside the park as a key concern. Other potential concerns included acid rain, trace metal contamination, and run-off from logging and road construction outside the park (Purvis et al. 2002). During field work in 2013, Service staff noted widespread soil erosion and sedimentation in Reconnaissance Areas 1 and 2 following heavy rains.

Birds, Mammals, Reptiles, and Amphibians

Terrestrial vertebrates are abundant and diverse in or near the Bluestone and New Rivers (Pauley 1993). A 1987 biological survey of New River Gorge documented over 100 species of birds, 30 species of small mammals, and 41 species of amphibians and reptiles (Buhlman *et al.* 1987). The actual number of bird and mammal species in these areas is expected to be about twice what this study found (NPS 2009). Beaver (*Castor canadensis*) and muskrat were found during the survey. Several species of ducks (Anatidae), Canada geese (*Branta canadensis*), great blue and green herons (*Ardea herodias* and *Butorides striatus*), osprey (*Pandion haliaetus*), and kingfishers (*Ceryle alcyon*) are among the birds that spend a substantial amount of time in or near the river. In addition, river otters (*Lutra canadensis*) were re-introduced into the New River area in the late 1990s (Purvis *et al.* 2002).

Several reptiles are generally found in or near water in this Area (Green and Pauley 1987). Watersnakes (*Nerodia sipedon*) and queen snakes (*Regina septemvittata*) frequent streams and are found in New River Gorge. Snapping turtles (*Chelydra serpentina*), map turtles (*Graptemys geographica*), painted turtles (*Chrysemys picta*), eastern river cooter (*Pseudemys c. concinna*), and spiny softshell (*Trionyx spiniferus*) are known from New River Gorge or nearby areas. All four of these turtles spend much or most of their time in or near water, but none of them are abundant.

Several amphibians are also common to abundant in the New River Gorge area (Green and Pauley 1987, Pauley 1993). Among the toads and frogs are spring peeper (*Pseudacris cruciferans*), gray tree frogs (*Hyla versicolor* and *H. chrysoscelis*), green frog (*Rana clamitans melatona*), bullfrog (*Rana catesbeiana*), and American toad (*Bufo a. americana*).

Several permanently aquatic salamanders are found in New River Gorge or surrounding counties (Green and Pauley 1987). The hellbender (*Cryptobranchus alleganiensis*) is a large (up to 20 inches) salamander that prefers cool, clear, mountain streams. Although they are nocturnal and hide during the day, they respond strongly to electric current and are occasionally seen by electrofishing crews. Adult red-spotted newts (*Notophthalmus viridescens*) are common and abundant in New River and nearby streams. Three stream

salamanders of genus *Desmognathus* are found in small streams of New River Gorge: the northern dusky salamander (*D. f. fuscus*), the Appalachian seal salamander (*D. m. monticola*), and the blackbelly salamander (*D. quadramaculatus*) (NPS 2009). Blackbelly salamanders are commonly used as fish bait, and are sometimes harvested by bait dealers. They are thought to be declining in abundance (Pauley 2005). Other stream salamanders of the area include the spring salamander (*Gyrinophilus porphyriticus*), northern red salamander (*Pseudotriton r. ruber*), northern two-lined salamander (*Eurycea bislineata*), and longtail salamander (*Eurycea l. longicauda*), all of which are found in springs or small headwater streams (NPS 2009).

2. Reservoir Resources

Bluestone Lake is the third largest body of water in West Virginia. It is a scenic lake surrounded by steep undeveloped upland forests. At normal summer pool (April through October), the dam impounds 2,040 acres and 10.7 miles of the New River and its tributary, the Bluestone River. When the flood control pool is in operation, the dam impounds over 36 miles of river (NPS 2009). In managing water releases from the reservoir, the Corps attempts to maintain relatively constant summer and winter lake pools in Bluestone Lake, 1410 and 1406 feet msl, respectively. However, due to the flood control function of the dam, releases do not correspond perfectly to a run-of-the-river pattern where inflow equals outflow (Purvis *et al.* 2002).

The reservoir provides excellent fishing for bluegill, large and smallmouth bass, hybrid bass, striped bass, crappie, muskellunge, and channel catfish (WVDNR 2006). Similar to the river, aquatic reptiles such as snapping turtles, map turtles, and painted turtles likely occur in the lake. Bones of the eastern river cooter were found at an archeological site near Bluestone Lake, confirming that this species is native (Purvis *et al.* 2002). Mallard duck (*Anas platyrhynchos*), Canada geese, great blue herons and bald eagles (*Haliaeetus leucocephalus*) occur at the lake year-round (Duda 1999). Other water-dependent birds that use the lake and nearby shoreline seasonally include: common goldeneye (*Bucephala clangula*), bufflehead (*B. albeola*), hooded merganser (*Lophodytes cucullatus*), ring-necked duck (*Aythya collaris*), lesser scaup (*A. affinis*), wood duck (*Aix sponsa*), green herons, osprey, and kingfishers (Duda 1999). River otter are occasionally seen in the lake (WVDNR 2006). Beaver, mink, and muskrat are more common in the lake and along the shoreline.

3. Riparian Areas and Wetlands

Riparian areas and wetlands occur at the interface between land and water. Collectively these areas represent only a small proportion of the landscape in the study area. However, their hydrologic and ecological importance is very significant. Collectively, these areas provide many critical functions including water supply, maintenance of water quality, flood attenuation, essential habitats for flora and fauna, and maintenance of biodiversity.

Riparian Areas

Natural riparian areas are some of the most diverse, dynamic, and complex biophysical habitats in the terrestrial environment (Naiman *et al.* 1993). The riparian area encompasses the stream channel between low and high water marks, as well as that portion of the terrestrial landscape above the high water mark where vegetation may be influenced by elevated water tables or flooding and by the ability of the soils to hold water (Naiman and Decamps 1997). Thus, riparian areas are ecotones between the aquatic habitat of a river and the surrounding terrestrial habitats. Riparian zones of most large streams are characterized by well-developed but physically complex floodplains with long periods of seasonal flooding, lateral channel migration, oxbow lakes in old river channels, a diverse vegetative community, and moist soils (Malanson 1993). These attributes suggest that riparian zones are key systems for regulating aquatic-terrestrial linkages and that they may be early indicators of environmental change (Decamps 1993).

Buhlmann and Vaughan (1985) and Buhlmann *et al.* (1987) characterized riparian areas within New River Gorge National River and developed an extensive list of plants associated with riparian habitats. This summary draws mainly from these descriptions.

Riparian sites in the southern section of New River Gorge, Hinton to Meadow Creek, consist primarily of small floodplain forests with sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), black willow (*Salix nigra*) and silver maple (*Acer saccharinum*) constituting most of the canopy (Buhlmann *et al.* 1987). Much of the floodplain forest has been cleared or altered for farmland, industry, and town and home sites.

A few unusual riparian habitat types occur in the southern section of the Gorge. These include a site dominated by Virginia pine (*Pinus virginiana*) and quaking aspen (*Populustremuloides*), and a talus slope near the I-64 bridge over New River that is dominated by eastern hemlock (*Tsuga canadensis*) and upland hardwoods. An unusual floral community, the Appalachian Rivers Flatrock Community, occurs on flat sandstone ledges at three locations within the park downstream of the dam (Camp Brookside, Sandstone Falls, and Keeney Creek). These areas provide habitat for communities of cedar, pines, locally rare sedges, and other rare plants (Vanderhorst 2007). The Appalachian flatrock community type is globally rare. These communities are dependent on the scouring caused by occasional flooding, which does not occur frequently because of the regulated water flow in the New River (Mahan 2004).

Downstream of Meadow Creek, the river channel narrows, stream gradient increases, and wide floodplain habitats are sparser. Rock rip-rap habitats predominate, with only a narrow band of riparian hardwoods separating the river from the upland forest. Wider floodplains are found at the confluence of major tributaries, such as Glade Creek in Raleigh County. Downstream from Thurmond, large talus blocks of sandstone from the cliffs above become the dominant riparian shoreline.

Tributary riparian areas were characterized primarily by hemlock, yellow birch (*Betula lutea*), red maple (*Acer rubrum*), and buckeye (*Aesculus glabra*). The common understory vegetation in these areas included rhododendron and ferns. Buhlmann *et al.* (1987) classified riparian areas into the following 10 habitat types: mature sycamore; willow; sycamore willow birch; stunted sycamore/willow; hemlock/rip-rap; riparian Virginian pine; rock riprap; boulder; tributary; and developed.

Wetlands

Wetlands are extremely valuable habitats. One third of all U.S. bird species, about 230 out of 686 species, depend on wetlands for one or more of their life requirements (Welsch *et al.* 1985). Approximately 190 species of amphibians, including frogs, toads, and salamanders, require wetlands to reproduce (Welsch *et al.* 1995). On a national level, wetlands comprise only about 5 percent of the land area of the 48 contiguous states (Welsch *et al.* 1995), and in West Virginia alone wetlands make up less than ½ of one percent of the land area (WVDNR 2005). In West Virginia, wetlands are home to 23 percent of its plant species, and thus provide one of the State's most critically important habitat types (WVDNR 2005).

Bluestone Lake comprises most of the open water wetland habitat in Reconnaissance Area 1. The types of wetlands in Areas 1 and 2 include temporarily flooded riverine wetlands on unconsolidated or rocky shores, permanently flooded riverine wetlands, and temporarily flooded, broad-leaved deciduous palustrine wetlands (Mahon 2004). In addition, the WVDNR notes there are at least 92 forest seeps and 28 beaver influenced wetlands in the New River Gorge National River (see WVDNR comment letter in NPS 2011). These wetlands are valuable habitat for a variety of waterfowl, herons, egrets, turtles, salamanders, frogs, muskrat, and mink.

Riverine wetlands are located in the river channel where the water is usually flowing, and bounded on the upland side or channel bank. The emergent water willow below the dam is an example of this type of wetland (NWI). Temporarily flooded wetlands refers to surface water that is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Unconsolidated shore includes all wetlands that have: 1) unconsolidated substrates with less than 75 percent areal cover of stones, boulders, or bedrock; and, 2) less than 30 percent areal cover of vegetation. Rocky shore includes wetlands characterized by bedrock, stones, or boulders that singly or in combination have an areal cover of 75 percent or more, and an areal coverage of vegetation of less than 30 percent. Palustrine wetlands are all non-tidal wetlands dominated by trees, shrubs, and persistent emergent vegetation. The palustrine system was developed to group vegetated wetlands traditionally called by such names as marsh, swamp, bog, and fen (Cowardin *et al.* 1979). Broad-leaved deciduous refers to dominant trees such as red maple, American elm (*Ulmus americana*), and ashes (*Fraxius sp.*), among others.

Of particular note, a significantly large bottomland forest wetland is known to occur at Crumps Bottom and the mouth of Indian Creek in Bluestone Lake (Area 1). This area

consists of scattered emergent and scrub/shrub wetlands, but it is predominantly palustrine forest. The forested wetlands contain many of the trees associated with the bottomland hardwood forest such as box elder, silver maple, red maple, slippery elm, black gum, and river birch. The common shrub species associated with these areas include black alder, buttonbush, silky dogwood, black willow, spicebush, and spiraeas. At the head of the dam's normal pool, siltation occurs, which negatively impacts the wetlands in the Crumps Bottom area; upstream the wetlands and bottomland hardwoods are in pristine condition (Service 1996).

Bottomland forest and swamps are essential life support systems for a tremendous array of wildlife species. Only a tiny fraction of bottomland forests and swamp habitat persists in West Virginia today, and this continues to decrease due to development pressure (WVDNR 2005). Because of the drastic decreasing trends of bottomland forests and swamps in West Virginia, these habitats are of high conservation priority (WVDNR 2005).

The NPS conducted a wetland delineation study for the New River between Hinton and the I-64 Bridge (NPS 2009, undated NPS files). Wetlands on National Wetland Inventory (NWI) maps were ground-truthed. For this stretch of New River Gorge, NWI maps showed 49 wetlands representing 11 wetland types. In contrast, the NPS study delineated 76 wetlands representing 21 wetland types. According to the NWI maps, the dominant wetland type was unclassified (53 percent potential wetlands), followed by palustrine wetlands (43.4 percent). For the NPS study, dominant wetland types were the broad leaved deciduous palustrine wetlands (43.4 percent; either temporarily, seasonally or intermittently flooded), followed by riverine wetlands (32.9 percent; either intermittently flooded aquatic beds, rocky bottoms, or unconsolidated bottoms). Two things were striking: 1) the difference in total wetlands identified (76 in the NPS study vs. 49 for the NWI maps); and the difference in the riverine wetlands (32.9 by NPS vs. 3.6 percent by NWI). The differences are probably attributable to the ground-truthing of wetland delineations. The 35.5 percent difference in total wetlands is significant for this reach, suggesting many more wetlands currently exist than shown on NWI maps. Whereas NWI maps are useful for a general understanding of the potential areal extent and types of wetlands that are present, NWI maps in West Virginia are now based on outdated aerial photography, often were not ground-truthed, and the scale (1:24,000) is not adequate to detect subtle changes that may be occurring with respect to habitat boundaries or species composition changes, or to delineate small wetland types such as seeps or springs.

4. Upland Forest

Forests surrounding the river in Areas 1 and 2 tend to be large, dense, diverse, and mature. The forests in this area are now over 70 years old, having recovered from widespread clear-cutting practices from the turn of the century through the 1930s and 1940s. Steep cliffs and rock faces exposed along valley slopes of the New River also contain remnant stands of old-growth trees (Purvis *et al.* 2002).

The terrestrial upland habitat surrounding Bluestone Reservoir and upstream of the dam is comprised mostly of forested land. The major forest types are oak-chestnut and mixed mesophytic forest; other forest types in the area include oak-hickory, oak-pine-hickory, and white pine. The remainder of the terrestrial habitat in the surrounding Bluestone Lake area is in old fields and pasture.

The New River Gorge National River is surrounded by a nationally significant large block of forest that contains over 40 plant communities containing at least 1,342 plant species and 54 rare plants, comprising the most diverse flora of any river gorge in central and southern Appalachia, and providing essential habitat for endangered mammals and rare birds and amphibians (NPS 2009). This plant diversity is due to the extremes in moisture gradients available in the gorge (Fortney *et al.* 1995). Terrain along the New River Gorge National River is steep, with a 1,200 foot elevation difference between the river and surrounding plateaus. These steep slopes are dominated by extensive unfragmented deciduous upland forests, smaller areas of conifer-dominated upland forest, and very small areas of specialized communities associated with cliffs (Vanderhorst 2007). The upper steep gorge communities include chestnut oak (*Quercus prinus*), black oak (*Quercus nigra*), and pignut hickory (*Carya glabra*) (Mahan 2004). Habitats are similar at like elevations throughout all reconnaissance areas (Corps 1997).

Due to these extensive forests, the quality of the terrestrial habitats in the New River Gorge portion of Reconnaissance Area 1 and 2 is optimum for a diverse group of birds, mammals, reptiles, and amphibians (Appendix B). The large forest with a diverse mosaic of habitats over a large elevational gradient supports abundant and diverse breeding populations of birds that spend their lives in the tropics but depend upon the unfragmented forests here for breeding, especially wood warblers, vireos, and thrushes (NPS 2009). A few other bird species that occur in Reconnaissance Areas 1 and 2 are osprey, peregrine falcon (*Falco peregrinus*), bald eagle, red bellied woodpecker (*Melanerpes carolinus*), Cerulean warbler (*Setophaga cerulea*), and scarlet tanager (*Piranga olivacea*) (Service 1978). The most common terrestrial game birds in the area are wild turkey, ruffed grouse, Northern bobwhite (*Colinus virginianus*), various species of waterfowl, mourning dove (*Zenaida aurita*), and American woodcock (*Scolopax minor*) (Service 1978). The Bluestone Lake Wildlife Management Area is renowned for its wild turkey population. A list of bird species which may use the New River Gorge National River are found in Appendix A.

Some mammalian species that could be found in terrestrial forest habitats in Reconnaissance Areas 1 and 2 are bobcat, black bear, longtail weasel (*Mustela frenata*), little brown bat (*Myotis lucifugus*), big brown bat (*Epitesicus fuscus*), eastern red bat (*Lasiurus borealis*), Alleghany wood rat (*Neotoma magister*), pygmy shrew (*Microsorex hoyi*), and white-footed mouse (*Peromyscus leucopus*) (Service 1978, Appendix B). Mammals hunted and trapped in the area include fox and gray squirrel, white-tailed deer, cottontail rabbit, woodchuck (*Marmota monax*), raccoon, and red and gray fox (Service 1978). These mammals use forests and tree cavities for foraging, shelter, and reproduction.

Appendix B lists 6 amphibian and 5 reptile species seen by NPS staff in the New River Gorge National River. A few reptiles and amphibians encountered in the terrestrial and riparian habitat in this area in 1978 by Service staff are snapping turtle, timber rattlesnake (*Crotalus horridus*), and American toad (*Bufo americanus*) (Service 1978). Other amphibian and reptile species potentially occurring in Area 1 and 2 forested uplands include the ravine salamander (*Plethodon richmondi*), eastern box turtle (*Terrapene c. carolina*), and garter snake (*Thamnophis sitalis*) (Pauley and Seidel 2002, Green and Pauley 1987).

5. Special Status Species

Special status species which may occur in Reconnaissance Areas 1 and 2 include threatened and endangered species, eagles, osprey and migratory birds. These include four federally listed species: the endangered Indiana bat (*Myotis sodalis*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and running buffalo clover (*Trifolium stoloniferum*), and the threatened Virginia spiraea (*Spiraea virginiana*).

Indiana bat

Indiana bats hibernate in clusters during the winter in cool humid caves or mines with stable temperatures under 50 °F, but above freezing. After winter they migrate to wooded areas which they use as summer habitat. Indiana bats roost under loose hanging tree bark on dead or dying trees. Females roost in large maternity groups averaging 60 bats, while males may roost alone or in small colonies. Indiana bats forage in or along the edges of forested areas and sources of water (Service 2007).

Winter hibernacula and summer roosting and foraging habitat of the endangered Indiana bat occurs in Reconnaissance Areas 1 and 2. There has been one live capture of an adult male Indiana bat in Reconnaissance Area 2 (Johnson et al 2003). The Indiana bat was captured on September 09, 2002 at Stone Cliff C, one of 47 abandoned mine portals where harp trapping occurred during a fall survey in the New River Gorge National River. The captured Indiana bat was less than 0.5 miles from the river itself. Likely Indiana bat calls were also detected during acoustic surveys conducted during the summers of 2003 and 2004 in the park. They were acoustically detected in Reconnaissance Area 1 (Bluestone Scenic National River) and in Area 2 (New River Gorge National River) (Castleberry *et al.* 2006).

Virginia big-eared bat

Unlike many other bats in West Virginia, Virginia big-eared bats use caves and mine portals year round; although they may use different caves for summer and winter. They also use exposed rock cliff-line habitats during summer. Females form maternity colonies in the warmest parts of caves and mine portals where they rear their young during summer, and hibernate in the colder parts of the cave and portals during the winter

(Service 1984). Virginia big-eared bats forage on moths and other insects in open areas (e.g. pastures and old fields), along forest edges, and in small openings in forests, avoiding clear-cuts.

Endangered Virginia big-eared bats have been captured in the New River Gorge National River in Reconnaissance Area 2. Bats were captured at 37 out of 47 portals that provide suitable bat habitat, and Virginia big-eared bats have been confirmed at 15 portals since 2002 (Johnson *et al.* 2003, Varner 2008; C. Stihler, WVDNR, pers. communication). During the 2002 surveys, a total of 3 Virginia big-eared bats were captured during summer at 2 sites (Area 2) and 25 during fall swarm harp trapping at 12 mine entrances in the New River Gorge National River (Area 2) (Johnson *et al.* 2003). Since 2007, harp trapping at the entrances to these abandoned coal mines in the New River Gorge National River during the late summer and fall swarming period have captured small numbers of Virginia big-eared bats (usually 1 to a few bats per portal on a given night) (Varner 2008). Whereas no large colonies have been discovered in the area, the population is likely larger than 15 to 28 bats because portal entrance surveys underestimate bats, and genetic studies have found that the VBEB in the New River area are genetically distinct from other populations (Piaggio *et al.* 2009).

Running buffalo clover

The federally endangered running buffalo clover requires periodic disturbance and a somewhat open habitat to successfully flourish, but it cannot tolerate full-sun, full-shade, or severe disturbance. Historically running buffalo clover was found in rich soils in the ecotone between open forest and prairie. Those areas were probably maintained by the disturbance caused by bison. Today, the species is found in partially shaded woodlots, mowed areas (lawns, parks, cemeteries), and along streams and trails.

This plant is listed as historically present in the New River Gorge in Reconnaissance Area 1; however, this location is outside of the park boundary (NPS 2009). Suitable habitat exists in Areas 1 and 2, according to a model of suitable habitat developed by the WVDNR with input from species experts. The plant is unlikely to occur in the riparian area immediately below Bluestone Dam due to sun exposure and frequent mowing on the right descending bank and due to full-sun and full shade conditions in areas on the left-descending bank. It may occur in suitable habitat in other parts of Reconnaissance Areas 1 and 2.

Virginia spiraea

The federally threatened Virginia spiraea occurs in riparian and wetland habitat and relies on periodic disturbances, such as high-velocity scouring floods, which eliminate competition from trees and other woody vegetation. However, if the frequency and intensity of these floods is too great, the plant may become dislodged and wash downstream into less suitable habitat. The species is known to occur along parts of the Bluestone National Scenic River in Mercer County (Reconnaissance Area 1) and along portions of the New River Gorge National River in Nicholas County (Reconnaissance Area 2).

A total of 35 locations have been noted for this species in Mercer and Summers Counties along the Bluestone River, including 5 now extirpated locations. One of the sites selected for biennial monitoring has been eroded to bare rock and the population is now extirpated. Another monitored population has been covered with excessive flood debris (logs, trash, etc) and the plants are now submerged. Monitoring has also noted that the populations are threatened by the encroachment of non-native invasive species such as purple loosestrife and severe overgrazing by deer.

There are 24 occurrences of Virginia spiraea along the Meadow River in Nicholas and Fayette Counties. Biennial monitoring indicates that the total extent of the population has increased by 22 percent since 1996, however the percent of Virginia spiraea covered within that area in 2005 has decreased by 29 percent, indicating the species may be stable but more dispersed. Overall, the Meadow River location has been judged as having excellent estimated viability.

There are approximately 50 occurrences of the species along the Gauley River in Nicholas and Fayette Counties. Biennial monitoring since 1996 indicates that the population appears to be stable to increasing. However, recent monitoring has also noted that the populations are threatened by all-terrain vehicle use and the encroachment of non-native invasive species such as Japanese knotweed (WVDNR unpublished data 2006b).

Eagles, Osprey, and Peregrine Falcons

Bald and golden eagles are both protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c) enacted in 1940. BGEPA prohibits take of eagles without a permit, and defines take to include “pursue, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb,” and prohibits take of individuals, and their parts, nests, or eggs. The Service expanded this definition by regulation to include the term “destroy” to ensure that take includes destruction of eagle nests. The term disturb is further defined by regulation as to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause injury to an eagle, a decrease in productivity or nest abandonment (50 CFR 22.3).

The bald eagle is present year-round in Reconnaissance Area 1. Although rare, bald eagles are increasing in numbers statewide. There is currently a nesting pair of bald eagles present on Brooks Island in the middle of the New River, approximately 6 miles downstream of the dam. Bald eagles also are seen foraging near the dam year-round. It is likely the Brooks Island nesting pair forages near the dam and reservoir as they lie within the typical foraging distance of a bald eagle. Golden eagles also migrate through the area and a few may overwinter in the area, based upon sightings during winter eagle surveys by volunteers from the Hanging Rock Observatory (2013). In the past few years both bald and golden eagles have been seen during winter near the Bluestone Dam and along the New River near Hinton.

The osprey is considered a species of concern by the Service and its status is being monitored throughout much of its range. The species occurs sporadically throughout

Reconnaissance Areas 1 and 2. An osprey was seen at Brooks Falls in 2009 by volunteers from the Hanging Rock Observatory (2013). Species of concern do not receive substantive or procedural protection under the Endangered Species Act. The Service does encourage Federal agencies and other appropriate parties to consider this species in the planning process. The peregrine falcon has been observed in the New River Gorge, and potentially nests on the cliff faces. Peregrine falcons have been hacked (raised on an artificial nesting platform in cages several weeks before the young eagles are ready to leave the nest, and are fed and watched over by human caretakers who work from a blind to ensure that the young eagles retain their fear of humans) in the New River Gorge National River but no current or historical nesting records exist for the park (NPS 2009). Previously federally listed, the peregrine was delisted due to recovery in 1999 and its status is being monitored to ensure relisting is not necessary.

Migratory Birds

The New River Gorge offers a great diversity of year-round residents and migrant bird species, over 200 species have been observed by National Park Service employees and visitors (NPS 2009). These birds are protected by the Migratory Bird Treaty Act (MBTA) (16 USC 760c-760g), as amended, which protects all native migratory game and non-game birds with exceptions for the control of species that cause damage to agricultural or other interests. The MBTA prohibits the take of any migratory bird, part, nest, egg, or product. In addition, over 60 migratory bird species have been spotted in the Bluestone National Scenic River and the New River Gorge National River (Reconnaissance Areas 1 and 2) that are considered to be species of concern in West Virginia; this list includes many of the birds of conservation concern (Appendix A).

Under Executive Order 13186, Federal agencies are expected to identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. In addition, the 1988 amendment to the Fish and Wildlife Conservation Act mandates the Service to “identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973.”

Toward this end, the Service has identified Birds of Conservation Concern (BCC). These migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) represent our highest conservation priorities (Service 2008). BCC lists have been identified for different Bird Conservation Regions (BCRs). BCRs are endorsed by the North American Bird Conservation Initiative as the basic units within which all bird conservation efforts are planned and evaluated (Service 2008).

The study area occurs within BCR 28, corresponding to the Appalachian Mountains. Of the 25 bird species of conservation concern in BCR 28, 16 may occur in Reconnaissance Area 1 and 2 (Appendix A). Many warblers appear on this list. Within Reconnaissance Area 1, the species with the smallest statewide populations and declining trends are

golden winged warbler, Swanson's warbler, red-headed woodpecker (*Melanerpes erthrocephalus*), and yellow bellied sapsucker (*Sphyrapicus varius*). Golden winged warblers are likely to occur in low second-growth forests and open woodlands; Swanson's warblers prefer floodplain and bottomland hardwood forests; red-headed woodpeckers prefer open oak groves; and yellow bellied sapsuckers are found in mixed hardwood forests. All these habitat types are present in Area 1, but are not associated with the tailwater area.

6. Species in Greatest Need of Conservation

Several bat species, fish species, an amphibian, crayfish, and a mussel species which potentially occur in Reconnaissance Areas 1 and 2 could be listed in the future as threatened or endangered. These species should be considered by the Corps during project planning.

The Service was petitioned to list the northern long-eared bat (*Myotis septentrionalis*) and eastern small-footed bat (*Myotis leibii*) due to the rapid spread of White-nose Syndrome (WNS), a fungus that has killed millions of bats. Of these two species, the Service has determined that listing of the eastern small-footed bat is not warranted but listing of the northern long-eared bat is warranted. Hence in October 2013, the Service proposed to list the northern long-eared bat as endangered (78 Federal Register 61046). A final listing decision is due by October 2014. The Service also is evaluating the status of the little brown bat, a once common bat whose populations have been decimated by WNS.

In addition to these bats, the Service also has received petitions to list as endangered or threatened six species that occur or potentially occur in Reconnaissance Areas 1 and 2: Bluestone sculpin (*Cottus sp.*), Eastern hellbender (*Cryptobranchus alleganiensis*), candy darter (*Etheostoma osburni*), popeye shiner (*Notropis ariommus*), New River crayfish (*Cambarus chasmodactylus*), and green floater (*Lasmigona subviridis*).

In addition to petitioned species, other rare species may occur in Area 1 and 2. Nature Serve ranks rare species based on documented occurrences, distributions, habitat, and threats to existing populations. Species are classified as state or globally vulnerable or imperiled because of extreme rarity or because of some factor(s) making them especially vulnerable to extinction or elimination.

The New River Gorge is home to 88 rare plants tracked by the West Virginia Natural Heritage Program. Of these, 88 species, 35 are classified as S-1 (extremely rare and critically imperiled) with 5 or fewer occurrences statewide, and 39 are classified as S-2 with 6 to 20 occurrences statewide (NPS 2009, 2011) (See Appendix B)

In addition, globally imperiled species typically have 6 to 20 occurrences or few remaining individuals (1,000 to 3,000). Species that are globally vulnerable typically have 21 to 100 occurrences or between 3,000 and 10,000 individuals.

The following 5 animals, considered globally vulnerable/ imperiled, are present/likely to occur in Reconnaissance Areas 1 and 2: Green salamander (*Aneides aeneus*), Northern metalmark (*Calephelis borealis*), Eastern big-eared bat (*Corynorhinus rafinesquii*),

Alleghany woodrat (*Neotoma magister*), Kanawha minnow (*Phenacobius teretulus*). The globally vulnerable/ imperiled Diana fritillary (*Speyeria diana*) also likely occurs in Area 2 (Appendix B).

The following 10 plants, considered globally vulnerable/imperiled, are also present/likely to occur in Reconnaissance Areas 1 and 2: spreading rock-cress (*Arabis patens*), American barberry (*Berberis canadensis*), bitter cress (*Cardamine flagellifera*), Appalachian gentian (*Gentiana austromontana*), Torrey's mountain-mint (*Pycnanthemum torrei*), Carey saxifrage (*Saxifraga careyana*), rock skullcap (*Scutellaria saxatilis*), Virginia mallow (*Sida hermaphrodita*), nodding pogonia (*Triphora trianthophora*), and sand grape (*Vitis rupestris*) (WVDNR 2012). Buffalo clover (*Trifolium reflexum*) and nodding onion (*Allium oxyphilum*) are also likely to occur in Area 1 and are ranked globally vulnerable/imperiled (Appendix B).

B. Reconnaissance Areas 3 and 4

1. Riverine Resources

The Kanawha River in Reconnaissance Areas 3 and 4 is a large navigable sixth order stream formed by the junction of the New River and Gauley River in Fayette County, West Virginia. The Kanawha River flows 97 miles in a northwesterly direction and enters the Ohio River at Point Pleasant, West Virginia. The major tributaries of the Kanawha River, in addition to the New and Gauley rivers, are the Coal River (enters the Kanawha River at mile 45.4), and the Elk River (enters the Kanawha River at mile 57.8). The lower 91 miles of the Kanawha River has been impounded by four locks and dams to create a 9-foot navigation channel that is maintained by the Corps through mechanical dredging to allow for the passage of navigable vessels. As a result of the impoundment, much of the lower Kanawha River has lake-like conditions for fish, with the exception of the areas closest downstream to the dam tailwaters. The upper Kanawha, downstream of the falls, is one of the few large rivers in the state that is relatively unaffected by impoundment and still retains approximately 5 miles of free-flowing characteristics including riffles and swift water. It is also above most historic point-sources of water quality degradation and is not affected by dredging, channel maintenance, or barge traffic.

Fish

The Service conducted fish sampling efforts in the Winfield Pool (located between River Miles 31 and 67 on the Kanawha River) between October 1982 and September 1983 (Service 2008). These efforts revealed 66 species of fish present within the Winfield Pool. Gizzard shad (*Dorosoma cepedianum*) dominated the adult fish community at both upper and lower sample sites (63.5 and 60.1 lbs/acre, respectively). Common carp, channel catfish, and smallmouth buffalo (*Ictiobus bubalus*) were secondarily the most abundant species. Other species commonly taken included sauger (*Stizostedion canadense*), freshwater drum (*Apodinotus grunniens*), spotted bass (*Micropterus punctulatus*), and emerald shiner (*Nicroperterus atherinoides*). Silver, golden, and

shorthead redhorse (*Moxostoma anisurum*, *M. erythrurum*, *M. macolepidotum*), and bluegill were taken at greater frequency at the upper pool reach than at the lower pool reach. When grouped by feeding guilds, herbivore/detritivores and omnivores constituted over two-thirds of the fish community. Production by the herbivore/detritivore group alone represented over half of the total fish community production. These sampling efforts revealed that the fish community in the Winfield Pool was dominated by larger specimens in the invertivore, planktivore, piscivore, and omnivore feeding guilds. Additionally, gizzard shad demonstrated the highest annual production of any species studied.

Current conditions of the fish populations and communities of the Kanawha River are in poor health as compared to other similar river systems in West Virginia (Service 2008). For example, biomass data from fish surveys conducted within the lock chambers of the Monongahela River system ranged from 579-587 lbs/acre, whereas biomass data from fish surveys conducted within lock chambers of the Kanawha River system ranged from 187-306 lbs/acre (Chris O'Bara, WVDNR personal comm., 2007). Investigations conducted by fisheries biologist of the WVDNR found limited numbers of sauger and walleye in the Kanawha River system as compared to both the Ohio and Monongahela River systems (Chris O'Bara, WVDNR personal comm., 2007). In 2003, catch per unit effort (CPUE) for spring investigations in the Ohio River was 746.8 sauger/hour, as compared to 27.2 sauger/hour for the Monongahela River, and 18.0 sauger/hour for the Kanawha River (Chris O'Bara, WVDNR personal comm., 2007). In addition, recent investigations by WVDNR fishery biologists have found depressed populations of littoral inhabiting fish species. Although littoral structural habitat appears to be adequate to support these fish species, abundance of littoral inhabiting fish species still remains low (Chris O'Bara, WVDNR personal comm., 2007). Abundance of all studied fish species still remains depressed in the Kanawha River system (Chris O'Bara, WVDNR personal comm., 2007).

Starting 2003, the State and Federal resource agencies began a restoration program for both sauger and walleye populations in the Kanawha River, and as a result of these efforts, the CPUE for these species increased significantly in the Kanawha River (Chris O'Bara, WVDNR personal comm., 2007). Other large river fish species such as paddlefish, blue catfish, and shovelnose sturgeon were virtually extirpated from the Kanawha River, but have begun to recolonize the Kanawha River ecosystem as a result of restoration efforts by the WVDNR, in partnership with other Federal resource agencies (Chris O'Bara, WVDNR personal comm., 2007).

Mussels

As previously mentioned, Kanawha Falls on the Kanawha River serves as a barrier to many aquatic species including fish and mussels. The Kanawha River is home to 36 native mussel species, but upstream of the falls only 8 species have been found (Taylor 1983; Clayton 2013). The area of the Kanawha River above the head of navigation to the Kanawha Falls, RM 90.57 to RM 95.5, provides outstanding habitat for freshwater mussels, and supports mussel beds that are extremely rich in abundance and diversity.

Thirty-six species, including five federally endangered mussels, the fanshell (*Cyprogenia stegaria*), the pink mucket pearly mussel (*Lampsilis abrupta*), the sheepsnose (*Plethobasus cyphus*), the spectaclecase (*Cumberlandia monodonta*), and the tubercled blossom (*Epioblasma torulosa torulosa*) have been identified in previous surveys within this reach. Due to the absence of both navigation traffic and the invasive zebra mussel, this area represents a refugia for native mussel species and is a prime recovery area for the federally endangered species that occur there. This reach of the Kanawha River has now been identified as a focus area for freshwater mollusks by the Ohio River Valley Mollusk Group.

The lower 75 miles of the Kanawha River currently is poor habitat for mussels because of navigation dams, chemicals, and industrial, urban, and agricultural development. However, with implementation and compliance with various environmental laws and regulations of the 1970's, water quality within the Lower Kanawha River is increasing. Increased water quality has improved the ability of the Lower Kanawha River to support various freshwater mussel species. Biologists are finding an increased abundance and species richness of freshwater mussel species in the Lower Kanawha River annually during diving surveys (Janet Clayton, WVDNR, personal communication, March 2008).

Crayfish

Swecker (2012) collected 8 species of crayfish from the Kanawha River in 2004 and 2005. Four species of crayfish, rusty crayfish (*O. rusticus*), northern crayfish (*O. virilis*), *O. cristavarius* (no common name), and robust crayfish (*C. robustus*), were collected from the Kanawha River mainstem while the Teays River crayfish was collected above Kanawha Falls and Sanborn's crayfish was collected from just upstream in the Elk River. Two additional species, little brown mudbug (*Cambarus thomai*) and the Appalachian brook crayfish, were recorded from one of three seine sites in the Hurricane Creek watershed.

Of these 8 species, the two non-native species dominated the collections (rusty crayfish and northern crayfish). Rusty crayfish comprised 66 percent of all crayfish collections in the Kanawha River. Northern crayfish was the next most abundant, comprising 21 percent of all collections; however, most were found upstream of Kanawha Falls and all were found along the river banks near boat ramps, areas heavily fished, backwater areas, and mouths of tributaries flowing into the Kanawha River. The abundance of northern crayfish in these shallow habitats makes them more likely to be caught as bait and transferred by fisherman. Swecker (2012) concluded that rusty crayfish appeared to be outcompeting northern crayfish, but they remain due to a constant reintroduction of northern crayfish to heavily fished areas.

Benthic Macroinvertebrates

During the Service's sampling in 1982 and 1983, sixty macroinvertebrate taxa were collected in upper Winfield Pool while 38 taxa were collected from the lower reach (Service 2008). Artificial substrates were colonized by a greater density of macroinvertebrates with higher taxonomic diversity than sand/silt substrates.

Macroinvertebrate concentrations on artificial cobble/pebble substrates in the upper pool were greatest in July (1.2 individuals per square inch) and lowest in January (0.005 individuals per square inch). Concentrations on artificial substrates in the lower pool were greatest during November (0.4 individuals per square inch) and lowest in January (0.003 individuals per square inch). Higher macroinvertebrate densities were recorded on artificial substrates placed outside the sailing line (0.79/square inch) than those placed in the sailing line (0.15/square inch). However, greater macroinvertebrate diversity was detected in substrates in the sailing line than those away from mid-channel.

Aquatic insects collected within the Kanawha River System, including the tributaries of the Elk, Pocatalico, and Coal Rivers, include, but are not limited to, the following: flatworms, planarians, segmented worms, leeches, aquatic earthworms, scuds, aquatic sowbugs, beetles, *Elmidae sp.*, *Palponya sp.*, *Chaoborus sp.*, *Limnophila sp.*, *chironomidae sp.*, mayflies, alderflies, dragonflies, stoneflies, caddisflies, snails, clams, and fingernail clams (Kanawha Valley Power Company 1979).

Water Quality

The mainstem of the Kanawha River throughout its length in Reconnaissance Areas 3 and 4 is currently listed as an impaired waterway on the State 303(d) stream list due to PCB contamination; hence advisories against eating fish from the river are in place. Within Reconnaissance Area 4, the entire lower section of the Kanawha River, from the junction of the Elk River to the Ohio River, also is impaired by fecal coliform contamination (WVDEP 2012). In addition, numerous smaller tributary streams are impaired by trace metals and poor biological integrity of aquatic species (WVDEP 2012). Historic and current coal mining has impaired more stream miles in the Kanawha River Basin than any other land use (WVDEP 2012). Coal mining has many negative effects that can continue for decades after mining ceases such as increased sedimentation, landscape-scale changes in geomorphology, and alteration of stream water chemistry. Agricultural practices, logging, chemical manufacturing, and urbanization along the river also contribute to degradation of water quality through pesticide and fertilizer runoff, erosion from heavily grazed fields, and loss of riparian habitat (Chambers and Messinger 2001). Chambers and Messinger (2001) analyzed benthic communities in the Kanawha River and determined that coal mining, more than any other land use, affected instream environment and abundance of pollution intolerant indicator species. Benthic invertebrate communities that were impaired had low number of pollution intolerant species and higher numbers of pollution tolerant species. This is an indication that segments of the Kanawha River, in Reconnaissance Areas 3 and 4 are still impaired because of certain land use practices, predominantly coal mining (Chambers and Messinger 2001).

2. Riparian Areas and Wetlands

Because of prior and ongoing disturbances, riparian and wetland habitats in Reconnaissance Areas 3 and 4 are primarily of low to moderate value, supporting a variety of common birds, mammals, fish, and amphibians. Little riparian vegetation remains along the Kanawha River. Where present within Area 3, the lower slopes of the Upper Kanawha River, from Kanawha Falls to Charleston, are predominated by sweet

gum (*Liquidambar styraciflua*), birch (*Betula sp.*), sycamore, and willow (*Salix sp.*). The Lower Kanawha area (Reconnaissance Area 4) has floodplains that are wider with lower slopes dominated by second and third growth forest communities (Corps 1986).

Waves from moving vessels constantly erode the riverbank and littoral areas in the navigation channel. Increased amounts of resuspended sediments have filled in islands, embayments, and backchannels. Pools have replaced natural features such as low-lying swamps and former river meanders. The most dominant wetland types found in Reconnaissance Areas 3 and 4, according to the NWI, are small scattered freshwater emergent wetlands and freshwater forested/shrub wetlands.

3. Upland Forest, Pasture, and Old Fields

The dominant upland vegetation types along the Kanawha River are mixed hardwood forests, coniferous forests, old fields, agricultural fields and pasture lands; all of which support a diversity of wildlife. The Upper Kanawha River, from Kanawha Falls to Charleston (Reconnaissance Area 3), is made up of well forested slopes and ridges dominated by basswood, oak, hickory, and American beech. Similar to Reconnaissance Areas 1 and 2, the most common game species in Reconnaissance Areas 3 and 4 are squirrel, deer, grouse, cottontail rabbit, woodchuck, quail, turkey, raccoon, duck, doves, woodcock, and fox (Corps 1986). Other game and furbearer species in these areas include black bear and muskrat. Common non-game mammals found in Reconnaissance Area 3 and 4 are groundhog, opossum, bobcat, skunk and bats (Corps 1986).

The agricultural fields, pasture lands and old fields in Area 4 provide good feeding habitat for raptors and smaller non-game bird species including field sparrow (*Spizella pusilla*), prairie warblers (*Setophaga discolor*) American goldfinch (*Spinus tristis*), Northern cardinal (*Cardinalis cardinalis*) and indigo bunting (*Passerina cyanea*) (Service 1978).

Other non-game species in the study area which depend on the terrestrial habitat include multiple species of turtles, snakes, salamanders, skinks, toads and lizards (Service 1993). Unique salamanders found in upland forests along the Kanawha River include the ravine salamander and Cumberland Plateau salamander (*Plethodon kentucki*) (Pauley 2004).

4. Special Status Species

Special status species which may occur in Reconnaissance Areas 3 and 4 include threatened and endangered species, eagles, and migratory birds. These include the same 3 listed species as in Areas 1 and 2: Indiana bat, Virginia big-eared bat, and running buffalo clover. In addition, five endangered mussels are found in the Kanawha River in Areas 3 and 4 in Fayette and Kanawha County: pink mucket (*Lampsilis abrupta*), tubercled-blossom pearly mussel (*Epioblasma torulosa torulosa*), fanshell mussel (*Cyprogenia stegaria*), sheepnose mussel (*Plethobasus cyphus*), and spectaclecase mussel (*Cumberlandia monodonta*). Most of these mussels are known from the vicinity of

Kanawha Falls in Reconnaissance Area 3. The Diamond darter (*Crystallaria cincotta*), an endangered fish, is found only in the Elk River, a tributary of the Kanawha River. The Elk River joins the Kanawha River in Reconnaissance Area 3.

Indiana Bat

Winter hibernacula and summer roosting and foraging habitat of the endangered Indiana bat occurs in Reconnaissance Areas 3 and 4. During 2003/2004, likely Indiana bat calls were acoustically detected in Reconnaissance Area 3 in the Gauley Unit of the New River National River, but no Indiana bats were captured (Castleberry *et al.* 2006).

Virginia Big-eared Bat

Due to proximity to the Fayette County population in the New River Gorge National River, Virginia big-eared bats may disperse through and occupy suitable habitat in Kanawha County in Area 3. The Kanawha River and surrounding slopes lie within the maximum observed 20-mile known dispersal distance of this species. Virginia big-eared bats move short distances between their winter and summer caves. They also forage in small openings, including forested edges, and old fields and pastures. Suitable foraging habitat and potential cave and mine portal habitat exists in Area 3.

Running buffalo clover

A disjunct population of running buffalo clover is known to occur at the mouth of the New River where it joins the Kanawha River, at the interface between Areas 2 and 3. Suitable habitat does not exist for this plant in Areas 3 and 4, according to a habitat suitability model developed by the WVDNR with input from species experts. This plant species has not been well surveyed in Areas 3 and 4.

Virginia spiraea

No known populations of Virginia spiraea occur in Areas 3 and 4. Suitable habitat for this plant does not exist within these areas according to the WVDNR habitat model for this species.

Endangered Mussels

The pink mucket and fanshell populations within the Kanawha River currently extend over an approximately 20 mile reach of river from Kanawha Falls (RM 95.5) downstream to Watson's Island (RM 75.5). Approximately 36 species are currently known to exist within this reach of the Kanawha River. This includes the pink mucket, fanshell, spectaclecase, and sheepnose. In addition, a freshly dead shell of the federally endangered tubercled blossom (*Epioblasma torulosa torulosa*) was found downstream of Kanawha Falls in 1969. This is the last known location of this species anywhere throughout its range, and this species may now be extinct (Service 2011).

It is likely that pink mucket, fanshell, spectaclecase, and sheepnose populations historically occurred throughout the entire Kanawha River system, and were contiguous with populations in the Ohio River. Pink mucket, fanshell, and sheepnose shells were all

found during archeological evaluations of Native American mussel middens along the Kanawha River near Buffalo (in the vicinity of RM 22) in Putnam County (Taylor 1983). However, the construction of locks and dams followed by the impoundment and dredging of the river, as well as historical water quality degradation, resulted in the extirpation of many species in the lower Kanawha River, and the restriction of most populations to the upper-most reaches of the river, particularly the 5 miles just below Kanawha Falls.

The Kanawha River is currently serving as a recovery area for the pink mucket, fanshell, spectaclecase, and sheepnose, because the number and distribution of these species, as well as other listed and more common species, has been increasing over time. At the time of listing, the pink mucket and the fanshell were only known to occur in the upper 5 miles of the Kanawha River. By 2000, mussel beds supporting the pink mucket and fanshell were known to extend down to around Wheeler Islands (RM 87.4). The documentation of the pink mucket near RM 80 represents the furthest downstream location of this species in recent record. In 2006, surveys documented individual fanshell at two locations between RM 77.6 and 75.5. In 2002, the spectaclecase was found at RM 78.5 by EnviroScience Inc., representing the first historical or current record in the Kanawha River. In 2005/2006 live or weathered dead specimens were also found by the WVDNR at two locations between RM 78.5 and 75.5. Recent records for the sheepnose in the Kanawha River are still restricted to the upper 5 miles. However, WVDNR surveys have documented evidence of recent recruitment and young mussels less than 5 years old within that area, suggesting that the sheepnose population may be able to expand in the future (WVDNR 2010). The expanding range of these species in the Kanawha River suggests that mussel populations in the river may be recovering given recent water quality improvements and limited direct habitat disturbances in the area. However, records within the Kanawha River outside of the upper 5 miles continue to be limited and typically consist of a few scattered individuals. In order for Kanawha River populations to continue to expand and become viable within the navigable portion of the river, water quality conditions must be maintained and improved, and habitat losses and degradation must be limited.

In 2011 at a permanent monitoring area on the Kanawha River at Kanawha Falls, 5 pink mucket mussels, 103 fanshell mussels, and 4 sheepnose mussels, were collected and tagged within the 25 meter by 25 meter monitoring area (WVDNR 2011).

Diamond Darter

As previously mentioned this species is found only in the Elk River and thus may occur in Reconnaissance Area 3 at the mouth of Elk River where it joins the Kanawha River (Stuart A. Welsh, Professor at WVU, personal communication, 2014). This fish is found mostly in medium to large sized rivers with moderate flows over clean sand, gravel and cobble mix of benthic substrate within the lower sections of riffles or upper parts of pools (Welsh & Wood 2008). The closest known location of diamond darters is approximately 4 miles upstream of the mouth of the Elk River. There is a record of a juvenile diamond darter being collected from near the confluence of the Elk River and the Kanawha River, however, the exact location of this collection is unverified (Barbara Douglas, personal communication, 2014).

Eagles

The bald eagle is present year-round in Reconnaissance Areas 3 and 4. Although rare, bald eagles are increasing in numbers statewide. There is currently a nesting pair of bald eagles present near Winfield City, in Putnum County (Rich Bailey, WVDNR, personal communication, 2014). Bald eagles have been seen in increasing numbers along the Kanawha and Ohio Rivers. Golden eagles also migrate through the area and a few may overwinter in the area, based upon telemetry data (Todd Katzner, Professor at WVU, personal communication, 2014).

Migratory Birds

The table in Appendix A lists 9 migratory bird species of conservation concern potentially present throughout Reconnaissance Areas 3 and 4. These birds are the eastern whip-poor-will (*Caprimulgus vociferous*), red-headed woodpecker, wood thrush (*Hylocichla mustelina*), Swainson's warbler (*Limnothlypis seainsonii*), Kentucky warbler (*Geothlypis formosa*), Canada warbler (*Cardellina canadensis*), prairie warbler, cerulean warbler, and worm-eating warbler (*Helmitheros vermivorum*).

5. Species in Greatest Need of Conservation

As previously mentioned, the Service has proposed to list the northern long-eared bat as endangered (78 Federal Register 61046). This species likely occurs in Reconnaissance Areas 3 and 4. Likewise, the Service is evaluating the status of the little brown bat and could propose to list it as endangered or threatened in the future. This species also likely occurs in Areas 3 and 4.

The Gauley River National Recreation Area (Area 3) is home to 37 rare plants tracked by the West Virginia Natural Heritage Program. Of these 37 species, 13 are classified as S-1 (extremely rare and critically imperiled) with 5 or fewer occurrences statewide, and 15 are classified as S-2 with 6 to 20 occurrences statewide (NPS 2009, 2011) (Appendix B).

In addition, globally imperiled species typically have 6 to 20 occurrences or few remaining individuals (1,000 to 3,000). Species that are globally vulnerable typically have 21 to 100 occurrences or between 3,000 and 10,000 individuals.

The following 10 globally vulnerable/imperiled animal species are present or likely to occur in Reconnaissance Areas 3 and 4: green salamander (*Aneides aeneus*), Eastern hellbender¹ (*Cryptobranchus alleganiensis*), Eastern small-footed bat (*Myotis leibii*), Alleghany woodrat (*Neotoma magister*), popeye shiner⁺² (*Notropis ariommus*), Ohio

¹ Indicates that this species has been petitioned to be listed as threatened or endangered under the ESA, and has the potential to be present in the study area.

² Indicates that this species has been petitioned to be listed as threatened or endangered under the ESA, and has the potential to be present in the study area.

lamprey (*Ichthyomyzon bdellium*), yellow lampmussel (*Lampsilis cariosa*), green floater¹ (*Lasmigona subviridis*), northern madtom (*Noturus stigmosus*), Elk River crayfish¹ (*Cambarus elkensi*), and Diana fritillary (*Speyeria diana*).

The following 14 plants are considered globally vulnerable/imperiled; they also are present/likely to occur in Reconnaissance Area 3 and 4: spreading rock-cress (*Arabis patens*), American barberry (*Berberis canadensis*), bitter cress (*Cardamine flagellifera*), Appalachian gentian (*Gentiana austromontana*), Torrey's mountain-mint (*Pycnanthemum torrei*), Carey saxifrage (*Saxifraga careyana*), rock skullcap (*Scutellaria saxatilis*), Virginia mallow (*Sida hermaphrodita*), buffalo clover (*Trifolium reflexum*), turgid gay-feather (*Liatris turgida*), Appalachian blue violet (*Viola appalachiensis*) Barbara's buttons¹ (*Marshallia grandiflora*), nodding pogonia (*Triphora trianthophora*) and sand grape (*Vitis rupestris*).

V. Preliminary Resource Categories Using the Service's Mitigation Policy

The Service's Mitigation Policy (Federal Register, Vol. 46, No. 15, 7644-7663, January 23, 1981) addresses mitigation for project impacts and is based on the sequential mitigation procedures outlined by the President's Council on Environmental Quality [40 CFR Part 150 . 20 (a-e)]. Since fish and wildlife and their habitats are public resources with clear commercial, recreational, social, and ecological value to the Nation, the Service's policy is to seek to mitigate losses of fish, wildlife, their habitats, and uses thereof from land and water developments. Four Resource Categories are used to ensure that the level of mitigation recommended is consistent with the fish and wildlife resource values impacted by a project. Below we describe each of the four the Resource Categories and provide our rationale for a preliminary determination of resource categories for the tailwater area immediately below Bluestone Dam (Table 1).

Assignment of resource categories is based in part on evaluation species. At this early stage in planning, we have only identified evaluation species for the Bluestone Dam tailwater area, the area most likely to be directly affected by the project and thus in need of mitigation. In coordination with the Corps and WVDNR, we selected 5 evaluation species representative of the Bluestone Dam tailwaters for our HEP. These were the smallmouth bass and common shiner (*Notropis cornutus*) for riverine habitat, the mink, black-capped chickadee (*Poecile atricapillus*), and yellow warbler (*Setophaga petechia*) for riparian habitat. Table 1. shows what resource categories were assigned to the riverine and terrestrial sites where the HEP was performed in Reconnaissance Area 1.

Table 1. Resource Categories for Reconnaissance Areas 1, the tailwater area of Bluestone Dam.

Site and Description	Site Size	Evaluation Species and HEP/HSI Scores	USFWS Resource Category
Riverine Site 1 – aquatic habitat immediately downstream of the stilling weir	125 Acres	Smallmouth bass (0.83), common shiner (0.80)	1 – high value habitat; unique or irreplaceable on a national or ecoregion basis; no loss of existing habitat value is acceptable
Riparian Site 1 – terrestrial habitat immediately below penstock stilling basin area	1.8 Acres	Mink (0.0), black-capped chickadee (0.48), yellow warbler(0.0)	4 – low value habitat
Riparian Site 2 – riparian corridor extending from current construction area and along Hinton City Park	1.4 Acres	Mink (0.55), black-capped chickadee (0.86), yellow warbler (0.33)	4 – low value habitat
Riparian Site 3 – terrestrial habitat along the left descending bank downstream of the fishing pier to the end of government property	2.5 Acres	Mink (1.0), black-capped chickadee (1.0), yellow warbler (0.32)	3 – medium/high value habitat; relatively abundant on a national or ecoregion basis

Resource Category 1 habitats are of high value for evaluation species and are unique and irreplaceable on a national basis or in the ecoregion; therefore there should be no loss of existing habitat value. Examples of Resource Category 1 and 2 habitats are wetlands, natural springs, vegetated shallows, stream riffle areas, sanctuaries, wildlife management areas, fish hatcheries, wildlife refuges, and scenic rivers. Examples of Resource Category 1 habitats in West Virginia are the Canaan Valley wetlands, the islands and mussel beds in the Ohio River, the mussel beds in the upper 5 miles of the Kanawha River, the Bluestone Wildlife Management Area, the Bluestone National Scenic River, the New River Gorge National Scenic River, and the tailwaters of the Ohio River locks and dams.

Consistent with our mitigation policy, we consider the following resources to be Category 1 habitats:

- (1) the approximately 10.5-mile long Bluestone National Scenic River (which includes the associated Bluestone Lake Wildlife Management Area managed by the WVDNR) in Reconnaissance Area 1, from a point approximately 2 miles upstream of the Summers and Mercer County line, downstream to the summer pool elevation of Bluestone Lake;
- (2) the 19.3-mile long New River wild and scenic river study area¹ in Reconnaissance Area 1, from the Route 460 Bridge in Glen Lyn, Virginia to the summer pool of Bluestone Lake in West Virginia;

¹ The National Park Service (2009) determined the study area met the resource value criteria for inclusion as a wild and scenic river, but the area was not designated due to lack of immediate threats, and lack of public and management agency support at the time.

(3) the 53-mile long (72,186 acre) New River Gorge National River from Hinton, West Virginia, in Reconnaissance Area 1 to Hawks Nest State Park, West Virginia, in Reconnaissance Area 2 (Figure 3).

(4) the tailwaters of the Bluestone Dam near Hinton West Virginia, in Reconnaissance Area 1.



Figure 2. New River Gorge National River.

The boundaries described above include the associated riverine, wetland, riparian, and terrestrial habitats adjacent to these rivers within the study area.

These resources are of high value and are unique and irreplaceable in the ecoregion. As further described in section IV.A of this PAL, these river sections and associated lands warrant a Resource Category 1 designation because:

- The New River and its tributary the Bluestone River are among the oldest rivers in the western hemisphere, and continue to sculpt the longest and deepest river gorge in the Appalachian Mountains (Purvis *et al.* 2002).
- The waters of the New and Bluestone River systems contain a mosaic of hydrologic features and aquatic habitats, support a unique aquatic ecosystem, and nourish a riparian zone that supports many rare plants, animals, and communities (NPS 2009).
- The Bluestone Scenic River and New River Gorge National River lie at the core of a nationally significant, expansive unfragmented forest containing the most diverse flora of any river gorge in central and southern Appalachia, and providing essential habitat for endangered mammals and rare birds and amphibians (NPS 2009).
- The habitat in the tailwaters of the dam is unique and irreplaceable, as detailed below.

As reflected in our HEP report, the tailwater area below Bluestone Dam is of high quality for the riverine evaluation species. This site scored a 0.83 and 0.80 Habitat Suitability Index for the smallmouth bass and the common shiner, respectively, out a possible maximum score of 1 (Service 2013). The combination of runs, riffles, and pools in this reach of river is near optimum

for the evaluation species. The tailwaters have numerous fish nursery areas in vegetated shallows of water willow, abundant fish food sources (aquatic insects), and ample places for fish to seek shelter behind large rocks. Such high value riverine habitats below dams are relatively scarce in the ecoregion. Of 10 COE reservoirs in West, the Bluestone tailwaters are renowned as the only wadeable tailwaters with a natural stream bottom and highly productive fishery. As far as habitat, other than just upstream of Sandstone Falls, the tailwaters have the most shallow ledge habitat where anglers can easily wade and any loss of this habitat will have a negative impact on angler opportunities (Mark Scott, WVDNR, personal communication, 2013). Hence the Bluestone tailwaters best fit Resource Category 1. For category 1 resources, because these one-of-a-kind areas cannot be replaced, we recommend avoiding all losses of existing Resource Category 1 habitat from any measures associated with the proposed modifications of Bluestone Dam and associated lands and waters. Insignificant changes that do not result in adverse impacts on habitat value may be acceptable provided they will have no significant cumulative impact.

It should be noted that in the unlikely event of a Probable Maximum Flood, or other high flow event, significant adverse effects to habitats in all reconnaissance areas downstream of Bluestone Dam would likely occur from flooding and streambed scour. Release of toxic chemicals could also occur in Areas 3 and 4 due to flooding of chemical facilities in Charleston. These effects should be fully evaluated as part of the No Action alternative in the Corps' supplemental Environmental Impact Statement.

Resource Category 2 habitats are of high value for evaluation species and are relatively scarce or becoming scarce on a national basis or in the ecoregion.

Resource Category 3 habitats are of high to medium value for evaluation species and are relatively abundant on a national basis or in the ecoregion. Some rivers and many upland forests fit this category.

We have classified the upland forest on the steep slopes bordering Bluestone Lake and the tailwater area below the dam as category 3. This second and third growth forest is relatively mature and intact, providing medium to high value habitat for a diverse array of wildlife species. Much of West Virginia is second and third growth forest. Hence this habitat type is relatively abundant in the ecoregion.

Likewise, because habitat values are moderate in riparian site 3 of Area 1 (the left descending bank below the dam), and because riparian habitat is relatively abundant in the ecoregion, we also have placed this site in resource category 3. This site scored a habitat suitability index of 1.0 for black-capped chickadee, 1.0 for mink, and 0.32 for yellow warbler on a scale of 0 to 1 (with 1 being optimum) (Service 2013). Riparian site 3 is not high quality habitat because it is dominated by non-native and invasive vegetation and the river banks are armored with rip rap. We recommend minimizing loss of trees in this area and replacing their value in-kind through replanting and maintenance of native vegetation, control of invasive vegetation, and elimination of the frequent mowing that currently occurs in portions of the area.

The mitigation goal for category 3 habitat is no net loss of habitat value while minimizing loss of in-kind habitat value. In-kind replacement is preferred, but limited substitution of different types of habitat (out-of-kind mitigation) perceived to be of equal or greater value to replace the lost habitat value may be acceptable.

Resource Category 4 habitats are of medium to low value for evaluation species and the mitigation goal is to minimize loss of habitat value. Agricultural lands and highly disturbed habitats are examples of resource category 4.

As reflected in our HEP report, riparian sites 1 and 2, on the right descending bank below the dam in Area 1, are of low quality due to poor tree canopy cover, the abundance of invasive and nonnative vegetation, habitat fragmentation, and poor species diversity. These sites scored Habitat Suitability Indices for evaluation species of 0.48 (black-capped chickadee), 0.0 (yellow warbler), and 0.0 (mink) at site 1. Site 2 scored a 0.86 (black-capped chickadee), 0.33 (yellow warbler), and 0.55 (mink) (Service 2013). We thus have categorized riparian sites 1 and 2 as resource category 4.

Since these areas possess relatively low habitat values, they likely exhibit the greatest potential for significant habitat improvements. Category 4 resources potentially could be used to mitigate impacts to Resource Category 2 and 3 losses; however, our first priority is to mitigate losses of habitat values within the impact area. Second priority would be to mitigate in proximity to the impact area within the same river. Third priority would be given to a mitigation site within the same river system and ecoregion section.

VI. Potential Impacts and Preliminary Ranking of Possible Design Measures

At this early stage of project planning, the Corps has identified a large number of possible solutions, including structural design and non-structural measures, to allow Bluestone Dam to operate under increased flood conditions. Initially, Corps staff brainstormed and identified approximately 85 measures (Corps 2013b). Since then the Corps has eliminated many measures as structurally and/or economically unfeasible, or by making certain measures design elements that will be incorporated into plans, leaving approximately 6 measures. Among those structural measures retained for further consideration are: full parapet wall, concrete overlay of exposed rock in stilling basin, modifying the existing stilling basin with super baffles, remote conventional stilling basin, and flip bucket stilling weir. The non-structural measure retained for consideration was to improve risk communication in the areas downstream of the dam.

Although project alternatives have not been identified at this time, potential alternatives are likely to involve the pairing of more than one design measure. Potential adverse impacts from the array of retained proposed measures include loss/fragmentation of riparian habitat, changes to the river bottom, altered flows, increased sedimentation, scour of the river bottom and banks, and changes in water depth and velocity. We anticipate that direct and indirect adverse impacts of the action alternatives would occur only in Reconnaissance Area 1, more specifically: (1) in the tailwaters of Bluestone dam to the Route 3 Bridge, and/or (2) along the riparian zone in this stretch of the river. Direct impacts from any of the alternatives can include permanent loss of habitat a specific distance downstream of the existing footprint, temporary impacts to recreation due to construction schedule and duration, and temporary erosion of the riparian island located river right in the tailwaters. Indirect impacts from the alternatives include alteration of habitat downstream due to the care and diversion of water (e.g. the use of cofferdams) and the alternation of habitat due to the different hydraulic regimes (e.g. the flip bucket, and no weir). Direct and indirect adverse impacts could cause loss of velocity shelters for fish and loss of optimal breeding habitat downstream.

The retained measures can be grouped into categories with similar potential adverse impacts. The least environmentally damaging measures are those that occur within the original footprint and do not require coffer cells downstream of the stilling basin, which includes the flip bucket, parapet wall, concrete overlay of exposed rock in stilling basin, and modifying the existing stilling basin with super baffles (within the original footprint). These measures will only have temporary impacts such as increased erosion and sedimentation, but these impacts are anticipated to be insignificant, or more easily mitigated.

The measures that are the most environmentally damaging are modifying the existing stilling basin with supper baffles (not in the original footprint) and the remote conventional stilling basin. These measures will have permanent aquatic habitat loss approximately 150 – 300 feet downstream of the original stilling basin and will require additional dewatering to set up cofferdams. These measures will require the most time and have the potential to significantly impact the downstream environment.

The preliminary recommendation of the Service is to choose an alternative plan that will have the least environmental impacts and will be temporary, such as the flip bucket or the concrete overlay of exposed rock in stilling basin.

VII. Recommendations

The sequential mitigation procedures, as described below, are used by the Service when making recommendations for appropriate mitigation for project impacts.

The first step in the sequence is avoiding the impact; this is accomplished either by not implementing the alternative or modifying it in a way that the impact no longer occurs. In order to fully explore avoidance as a mitigation tool, analyses of feasible alternatives must be thorough. Impacts may be avoided by implementing an alternative plan that accomplishes the same objectives without causing the negative environmental effects.

If avoidance is not possible and the quality of the habitat permits, the remaining steps are followed as presented: limit the magnitude or degree of the action to minimize impacts; repair or restore the affected environment to rectify the negative impact; use preservation and maintenance operations during the life of the project to reduce or eliminate the impact over time; and replace or provide substitute resources or environments to compensate for the impact. Compensation is the last option pursued, because the resource benefits the most if it remains intact and in place.

The Service provides the following preliminary mitigation recommendations to avoid, minimize and mitigate potential adverse impacts of the proposed dam and other land and water modifications to fish and wildlife resources and their habitats.

In order to avoid and minimize negative impacts to the aquatic environment of the New River to the maximum extent practicable, the Corps should avoid impacts to high quality habitat areas as classified by the Service's Mitigation Policy. In particular, effects to Resource Category 1 habitats should be avoided because these one-of-a-kind areas cannot be replaced. We recommend avoiding all losses of existing Resource Category 1 habitat from any measures associated with the proposed modifications of Bluestone Dam and associated lands and waters.

Changes to the natural river bottom in the tailwater area should be kept to a minimum as much as possible because it will be very difficult to adequately compensate for loss of aquatic habitat values of this Category 1 resource with high habitat suitability index scores for evaluation species. We recommend selecting an alternative that does not involve permanent or long-term loss of habitat within the tailwaters so that only the short term and temporary negative impacts will need mitigation.

Any alternatives developed by the Corps which involves stopping or redirecting flow should include information on the location, timing, and duration of changes. If flow of the New River must be stopped, construction should be arranged such that flow is disrupted for the minimum time necessary; flows should be resumed after no longer than 24 hours. Loss of fishing opportunity should be eliminated by maintaining access to the shoreline. Anglers should then be able to continue to access the waters below the stilling basin. Instream work should not be done during fish breeding/spawning seasons. Best management practices (BMP's) should be used to minimize erosion and sedimentation. BMPs include, but are not limited to, the following: installation of sediment and erosion control devices (e.g., silt fences, hay bales, temporary sediment control basins, erosion control matting); adequate and continued maintenance of sediment and erosion control devices to insure their effectiveness; location of equipment staging, fueling, and maintenance areas outside of wetlands, streams, and riparian areas; and preventing sediment, debris, and pollutants from entering the New River as much as possible.

Tree cutting should be minimized by clearing in previously disturbed areas. Seasonal restrictions for tree clearing should be followed to prevent taking bird nests, eggs, and young. We recommend that the clearing of natural or semi-natural habitats (e.g., forests, woodlots, reverting fields, fencerows, shrubby areas) be carried out between September 1 and March 31, which is outside the nesting season for most native bird species. Without undertaking specific analysis of breeding species and their respective nesting seasons on the project site, implementation of this seasonal restriction will avoid direct take of most breeding birds, their nests, and their young (*i.e.*, eggs, hatchlings). If eagles are found nesting in the tailwater area different seasonal clearing periods may be recommended. As previously mentioned, the BGEPA prohibits anyone from taking or disturbing bald eagles and their nests. It is critical to ensure that the banks of the river and slopes are revegetated with native trees and shrubs in any areas of the river that are cleared or relocated.

Additional consultation with the Service's West Virginia field Office in regards to protection of the federally listed Indiana bat will be needed if alternatives involving timber removal are retained for full analysis.

Adverse impacts to aquatic downstream habitats due to accidental spills should be avoided by incorporating appropriate techniques to eliminate or reduce the spill potential. These techniques should be incorporated along transport routes as well as at the construction location. Measures also need to be taken to prevent introduction of concrete cuttings into the waterway.

Incorporation of these measures into the plan formulation should avoid and minimize significant negative fish and wildlife resource impacts from occurring.

VIII. Literature Cited

- Bates, J.M. 1979. Mussel investigations, State of West Virginia. W. Va. Project 3-97-R. 91 pp.
- Brown, R. E., and J. G. Dickson. 1994. Swainson's Warbler (*Limnothlypis swainsonii*). In *The Birds of North America*, No. 126 (A. Poole, and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.
- Buckelew, Albert R. Jr. West Virginia Breeding Bird Atlas. Pittsburgh: University of Pittsburgh Press, 1994.
- Buehler, D. A. 2000. Bald Eagle (*Haliaeetus leucocephalus*). In *The Birds of North America*, No. 564 (A. Poole and F. Gill, eds.). *The Birds of North America Online*, Ithaca, New York.
- Buhlmann, K.A. 1990. A naturalist's view of the New River Gorge National River. Eastern National Park and Monument Association.
- Castleberry, S.B., Miller, K.V., and Ford, W.M. 2006. Survey of bat communities in the New, Gauley, and Bluestone River National Park Areas. Final Report to the National Park Service. 35 pp.
- Chambers, D.B., and Messinger, T. 2001, Benthic Invertebrate Communities and Their Responses to Selected Environmental Factors in the Kanawha River Basin, West Virginia, Virginia, and North Carolina: U.S. Geological Survey Water Resources Investigation Report 01-4021. 52 p.
- Cink, C. L. 2002. Eastern Whip-poor-will (*Caprimulgus vociferus*). In *The Birds of North America Online*, No. 620 (A. Poole, Ed.). Cornell Lab of Ornithology, Ithaca, NY.
- Confer, J. L. 1992. Golden-winged Warbler (*Vermivora chrysoptera*). In *The Birds of North America*, No. 14 (A. Poole, P. Stettenheim, and F. Gill, eds.). *The Birds of North America Online*, Ithaca, New York.
- Conway, C.J. 1999. Canada Warbler (*Wilsonia canadensis*). In *The Birds of North America*, No. 421 (A. Poole and F. Gill, eds.). *The Birds of North America, Inc.*, Philadelphia, PA.
- Cowardin, Lewis M. 1979. Classification of wetlands and deepwater habitats of the United States. United States Fish and Wildlife Service. Biological services program; FWS/OBS-79/31 .
- Duda, M.D. 1999. West Virginia wildlife viewing guide. West Virginia Division of Natural Resources, Elkins, WV.
- Fortney, R.H., S.L. Stephenson, and H.S. Adams. 1995. Reconnaissance vegetation study of the Bluestone, New, and Gauley River Gorges. Final Report. New River Gorge National River. Glen Jean, WV.
- Green, N.B. and T.K. Pauley. Amphibians and reptiles in West Virginia. 1987. University of Pittsburgh Press, Pittsburgh. Pennsylvania.

- Hamel, P. B. 2000. Cerulean Warbler (*Dendroica cerulea*). In *The Birds of North America*, No. 557 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Hanging Rock Observatory. 2013. Summary of winter eagle survey results. Accessed on-line 12/22/2013: www.hangingrocktower.org.htm.
- Hanners, L.A., and S.R. Patton. 1998. Worm-eating Warbler (*Helminthos vermivorus*). In *The Birds of North America*, No. 367 (A. Poole and F. Gill, eds.). The Birds of North America, INC., Philadelphia, PA.
- Jenkins, R.E., and N.M. Burkhead. 1994. *Freshwater fishes of Virginia*. American Fisheries Society. Bethesda, MD.
- Jezerinak, R. F., G. W. Stocker and D. C. Tarter. 1995. The crayfishes (Decapoda: Cambaridae) of West Virginia. *Bulletin of the Ohio Biological Survey* 10(1): 193 p.
- Jirka, K.J. and R.J.Neves. 1987. A review of the mussel fauna of the New River. Virginia Cooperative Fishery Research Unit, Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Johnson, J.B., Wood, P.B., Edwards, J.W. 2003. Survey of abandoned mine portals for bats at the New River Gorge National River and Gauley River National Recreation Area, West Virginia. Final Report. Morgantown, WV. 95 pp.
- Mahan, C. G. December 2004 (revised March 2005). A Natural Resource Assessment for New River Gorge National River. Technical Report NPS/NER/NRTR--2004/002. National Park Service. Philadelphia, PA.
- Markham, S. L., C. H. Hocutt and J. R. Stauffer, Jr. 1980. The crayfish (Decapoda: Astacidae and Cambaridae) and the freshwater mussels (Mollusca: Pelecypoda) of the lower New River, Virginia and West Virginia. *Natural History Miscellanea* 708. 11 pp.
- Naiman, R., H. Decamps, and M. Pollock. 1993. The role of riparian corridors in maintaining regional biodiversity. *Ecological Applications* 3.
- National Park Service. 2009. Draft foundation plan for the New River Gorge National River. New River Gorge National River, Glen Jean, WV. Accessed on-line 12/19/13 at <http://www.parkplanning.nps.gov/documentsList.cfm?parkID=259&projectID=11040>
- National Park Service Bird List. 2009. <http://www.nps.gov/neri/naturescience/upload/CHK-birds09.pdf>
- National Park Service. 2011. Abbreviated Final General Management Plan/Environmental Impact Statement, and Foundation Plan for the New River Gorge National River, West Virginia. New River Gorge National River, Glen Jean, WV. Accessed on-line 12/19/13 at <http://www.parkplanning.nps.gov/documentsList.cfm?parkID=259&projectID=11040>
- National Park Service Mammals. 2013a. <http://www.nps.gov/neri/naturescience/mammals.htm>

- National Park Service Reptiles. 2013b. <http://www.nps.gov/neri/naturescience/reptiles.htm>
- Nolan, V., Jr., E. D. Ketterson, and C. A. Buerkle. 1999. Prairie Warbler (*Dendroica discolor*). In *The Birds of North America*, No. 455 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
- Pauley, T.K. 1993. Report of upland vertebrates in the New River Gorge National River (3 volumes). Report submitted to New River Gorge National River. Glen Jean, WV.
- Pauley, T.K. 2004. Salamanders of West Virginia. Brochure prepared for West Virginia Division of Natural Resources, Elkins, WV.
- Pauley, T.K. 2005. Reflecting upon amphibian conservation. Pages 277-281 in Lannoo, M..J. (ed.). *Amphibian declines: the conservation status of U.S. species*. University of California Press, Berkeley and Los Angeles., CA.
- Pauley, T.K. and M. Seidel. 2002. Turtles and lizards of West Virginia. Brochure prepared for West Virginia Division of Natural Resources, Elkins, WV.
- Partners in Flight Science Committee 2013. Population Estimates Database, version 2013. Available at <http://rmbo.org/pifpopestimates>. Accessed on August 21, 2013.
- Pennak, R.W. 1989 *Fresh-water invertebrates of the United States, Protozoa to Mollusca*. 3rd Ed. John Wiley and Son, NY.
- Piaggio, A.J., K. W. Navo, and C. W. Stihler. 2009. Intraspecific comparison of population structure, genetic diversity, and dispersal among three subspecies of Townsend's big-eared bats, *Corynorhinus townsendii townsendii*, *C. t. pallescens*, and the endangered *C. t. virginianus*. *Conservation Genetics* 10:143–159.
- Purvis, J.M., M. Mathes, T. Messinger, J. Wiley, and K. Paybins. 2002. Water resources management plan: New River Gorge National River, Gauley River National Recreation Area, Bluestone National Scenic River, West Virginia. Report. National Park Service, Glen Jean, WV.
- Rogers, J. H., D. S. Cherry, K. L. Dickson and J. Cairns, Jr. 1979. Invasion population dynamics, and elemental accumulation of *Corbicula fluminea* in the New River at Glen Lyn, Virginia. Pp. 99-110 in *Proceedings of the 1st International Corbicula Symposium*. Texas Christian University Research Foundation, Texas Christian University, Fort Worth.
- Roth, R. R., M. S. Johnson, and T. J. Underwood. 1996. Wood Thrush (*Hylocichla mustelina*). In *The Birds of North America*, No. 246 (A. Poole and F. Gill, eds.). The Birds of North America Online, Ithaca, New York.
- Shanks, L.R., and R.J. Misso, 1994. "Mitigation Policy of the Fish and Wildlife Service – In Perspective," U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C., 43 pp.

- Strakosh, T.R., Gido, K.B., Guy, C.S., 2009. Effects of American Water Willow Establishment on Density, Growth, Diet, and Condition of Age-0 Largemouth Bass in Kansas Reservoirs. Vol. 138, Iss. 2, 12 pp.
- Suiter, D.W. 1995. The vascular flora, rare species and plant migrations of New River Gorge National River, West Virginia. Master's thesis. Marshall University. Huntington, WV.
- Taylor, R.W. 1983. A survey of the freshwater mussels of the Kanawha River from riverhead to river mouth. Final report. U.S. Army Corps of Engineers. Huntington District, WV.
- Tolin, W. A. 1985. Survey of freshwater mussels New River (Wylie Islands to Bluestone Lake), lower Bluestone River, and lower Indian Creek, Summers County, West Virginia. Pp. 19 – 26 in Proceedings New River Symposium April 11-13 1985, Pipestem, West Virginia. National Park Service, Oak Hill, WV.
- U.S. Army Corps of Engineers, 1994. "Draft Reconnaissance Level Evaluation Report for Bluestone Lake Hydropower Study," Huntington District, WV. 143 pp.
- U.S. Army Corps of Engineers, 1986. "Kanawha River Navigation Study: Interim Feasibility Report Winfield Lock Replacement Vol. 1 Main Report and Environmental Impact Statement," Huntington District, WV.
- U.S. Army Corps of Engineers. 1997. Bluestone Lake Dam Safety Assurance Program Draft Environmental Impact Statement, Huntington District, WV.
- U.S. Army Corps of Engineers. 2004. Fish survey, tailwaters of Bluestone Dam. Huntington District, WV.
- U.S. Army Corps of Engineers. 2011. Mussel Survey, tailwaters of Bluestone Dam. Huntington District, WV.
- U.S. Army Corps of Engineers. 2013a. Fiscal year 2014, Civil works budget detail. U.S. Army Corps of Engineers, Washington, D.C. Accessed on-line 12/22/13 at http://www.usace.army.mil/Portals/2/docs/civilworks/budget_just/just_2014_voll/pdf
- U.S. Army Corps of Engineers. 2013b. Bluestone Dam Risk Reduction and Management Measures Identification Meeting report. Huntington District, WV. 45 pp.
- U.S. Fish and Wildlife Service. 1993. Fish and Wildlife Coordination Act Report Marmet Locks Modification Project. West Virginia Field Office, Elkins West Virginia. 41 pp.
- U.S. Fish and Wildlife Service. 1996. Planning Aid Report Fish and Wildlife Resource Impacts Bluestone Dam Safety Assurance Program Summers County, West Virginia. 22 pp.
- U.S. Fish and Wildlife Service. 1979. Preliminary Habitat Evaluation Report of the Proposed Bluestone Pumped Storage Project, Location "G", of the Kanawha Authorization Study. West Virginia. 51 pp.

- U.S. Fish and Wildlife Service. 1978. Preliminary Report of Fish and Wildlife Resources Associated with Alternative Reservoir Complex Location “G” of the Kanawha Authorization Study and the Gauley River Hydropower Authorization Study. Elkins, West Virginia. 99 pp.
- U.S. Fish and Wildlife Service. 1984. A Recovery Plan for the Ozark Big-Eared Bat and the Virginia big-eared bat. Atlanta, GA.
- U.S. Fish and Wildlife Service. 1985a. Recovery Plan for the Pink Mucket Pearly Mussel (*Lampsilis orbiculata*). Atlanta, GA. 52 pp.
- U.S. Fish and Wildlife Service. 1985b. Recovery Plan for the Tubercled-blossom Pearly Mussel (*Epioblasma* (=Dysnomia) *torulosa torulosa*), Turgid-blossom Pearly Mussel (*Epioblasma* (=Dysnomia) *turgidula*), and Yellow-blossom Pearly Mussel (*Epioblasma* (=Dysnomia) *florentina florentina*).
- U.S. Fish and Wildlife Service. 1991. Fanshell (*Cvoroaenia stegaria* (—i. *irrorata*)) Recovery Plan. Atlanta, GA. 37 pp.
- U.S. Fish and Wildlife Service (USFWS). 2002. National Wetlands Inventory: a strategy for the 21st century. U.S. Department of Interior. Washington DC.
- U.S. Fish and Wildlife Service, 2004. Final Habitat Evaluation Procedures Analysis Lower Mud River Flood Control Project. West Virginia Field Office, Elkins, WV. 76 pp.
- U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.
- U.S. Fish and Wildlife Service (USFWS). 2008. Revised Final Fish and Wildlife Coordination Act Planning Aid Letter for Winfield Improvement Project; Putnam County, West Virginia. Prepared by the West Virginia Field Office for the U.S. Army Corps of Engineers.
- U.S. Fish and Wildlife Service. 2011. Tubercled Blossom (*Epioblasma torulosa torulosa*) 5-Year Review: Summary and Evaluation. Asheville, NC.
- U.S. Fish and Wildlife Service (USFWS). 2013a.
<http://www.fws.gov/midwest/endangered/clams/sheepnose/SheepnoseFactSheetMarch2012.html>
- U.S. Fish and Wildlife Service. 2013b.
<http://www.fws.gov/midwest/Endangered/clams/spectaclecase/SpectaclecaseFactSheetMarch2012.html>
- Vanderhorst, J.P., J. Jeuck, and S.C. Gawler. 2007. Vegetation Classification and Mapping of New River Gorge National River, West Virginia. Technical Report NPS/NER/NRTR-2007/092. National Park Service. Philadelphia, PA.

- Varner, M.S. 2008. Spring emergence and fall swarm bat monitoring at New River Gorge National River. Program report NPS/NER/NERI-1428-07B. National Park Service, Glen Jean, WV.
- Walters, E.L., E.H. Miller, and P.E. Lowther. 2002. Yellow-bellied Sapsucker (*Sphyrapicus varius*). In *The Birds of North America*, No. 662 (A. Poole and F. Gill, eds.). *The Birds of North America Online*, Ithaca, New York.
- Wellman, D.I., Jr. 2004. Post-flood recovery and distribution of fishes in the New River Gorge National River, West Virginia. Master's Thesis. West Virginia University. Morgantown.
- Welsch, David J.; Smart, David L.; Boyer, James N.; Minken, Paul; Smith, Howard C.; McCandless, Tamara L. 1995. *Forested Wetlands NA-PR-01-95*. [Radnor, PA:] U.S. Dept. of Agriculture, Forest Service, Northern Area State & Private Forestry.
- Welsh, S.A., D.A. Cincotta, and J.F. Switzer. 2006. *Fishes of Bluestone National Scenic River*. Technical Report NPS/NER/NRTR – 2006/049. National Park Service. Philadelphia, PA.
- Welsh, S.A. and R.M. Wood, 2008. *Crystallaria cincotta*, a new species of darter (Teleostei: Percidae) from the Elk River of the Ohio River drainage, West Virginia. *Zootaxa* 1680:62-68.
- West Virginia Division of Environmental Protection. 2012. Final West Virginia integrated water quality monitoring and assessment report, U.S. EPA approved. Charleston, WV. Accessed on-line 12/22/13 at http://www.dep.wv.gov/WWE/WATERSHED/IR/Pages/303d_305b.aspx
- West Virginia Division of Natural Resources. 2006a. Field trip: Bluestone State Park and Wildlife Management Area. *West Virginia Wildlife Magazine*, winter 2006. <http://www.wvdnr.gov/wildlife/magazine/archive/06winter/FieldTrip.pdf>
- West Virginia Division of Natural Resources. 2010. Federal Assistance Performance Report Endangered Species (Animals) Project E-1, Segment 27 (1 October 2009 – 30 September 2010).
- West Virginia Division of Natural Resources. 2011. Federal Assistance Performance Report Endangered Species (Animals) Project E-1, Segment 28 (1 October 2010 - 30 September 2011). Section 6 Reports.
- West Virginia Division of Natural Resources (WVDNR), Natural Heritage Program. 2005. *Wildlife Conservation Action Plan*. Elkins, WV. <http://lutra.dnr.state.wv.us/cwcp/IUCN>. 2012. Red List of Threatened Species (ver. 2012.1).
- West Virginia Division of Natural Resources (WVDNR). 2006b. Summary of the Status of Virginia Spiraea in West Virginia. Unpublished data.
- White, C. M., N. J. Clum, T. J. Cade, and W. G. Hunt. 2002. Peregrine Falcon (*Falco peregrinus*). In *The Birds of North America* No. 660 (A. Poole and F. Gill, eds.). *The Birds of North America Online*, Ithaca, New York.

APPENDIX A

Birds of Conservation Concern in the Study Area of the Bluestone Dam Safety Project

Common name	Scientific Name	West Virginia Population Estimates	Habitat Type	Diet	Nesting Sites	Reason for Decline	Reconnaissance Area	Tailwater Area	Works Cited
Whip-poor-will	<i>Caprimulgus vociferous</i>	20,000	Hardwood-hemlock or hardwood white pine forests	Insects	On the ground among dead tree leaves	Loss of open-understory forests	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Cink 2002)
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	300	Open oak groves with little understory cover	Flying insects, fruit and mast	Dead trees or dead parts of live trees	Loss of nut-producing trees and availability of dead trees in open-forest habitats	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013),(Buckelew 1994), (WVDNR 2005)
Black-capped Chickadee	<i>Poecile atricapillus</i>	110,000	Mixed deciduous-coniferous and Northern hardwood forests	Insects, seeds and berries	Dead standing trees, fence posts, bird boxes, old woodpecker holes and natural cavities		1,2	Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994)
Wood Thrush	<i>Hylocichla mustelina</i>	920,000	Mature or near mature deciduous forests	Insects and fruit	Fork or horizontal branch 2 to 15 meters above the ground	Habitat fragmentation in both breeding and wintering grounds	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005), (Roth et al. 1996)
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	70,000	Second-growth woodlands, brushy areas and power line right-of-ways	Insects and spiders	Ground or in a low bush		1,2	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005)

Golden-winged Warbler	<i>Vermivora chrysoptera</i>	6,000	Low second-growth forests, open woodlands and power line right-of-ways	Insects and spiders	Ground or in a low bush	Habitat loss, hybridization, competition with the closely related Blue-winged Warbler, and invasive Phragmites	1,2	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005), (Confer 1992)
Prairie Warbler	<i>Dendroica discolor</i>	50,000	Young pine forests, young second growth hardwoods, over grown pastures and other brushy scrub areas	Insects and spiders	Shrubs or in the lower branches of pine or cedar trees	Loss of breeding habitat through development and natural change of shrubby habitat to forest	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005), (Nolan 1999)
Cerulean Warbler	<i>Dendroica cerulean</i>	200,000	Mixed mesophytic and Appalachian oak forests	Insects and some plant material	Horizontal limb of a deciduous tree in mid-to upper-canopy	Fragmentation and elimination of habitat	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005), (Hamel 2000)
Worming-eating Warbler	<i>Helmitheros vermivorus</i>	80,000	Areas where deciduous and mixed forests overlap with patches of dense understory shrubs	Caterpillars, spiders and other insects	Ground	Dependence on large forests for nesting make it vulnerable to population decreases	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Hanners 1998), (WVDNR 2005)

Swainson's Warbler	<i>Limnothlypis swainsonii</i>	3,000	Associated with swamps, rivers, floodplain forests and bottomlands hardwood forests	Insects and spiders	Build a bulky cup nest a meter or two from the ground in dense understory	Extreme habitat specificity puts species at risk from habitat loss	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005), (Brown and Dickson 1994)
Louisiana Waterthrush	<i>Parkesia motacilla</i>	40,000	Along streams flowing through valleys of heavily wooded deciduous forests	Insects and occasionally small fish and frogs	Cavities on stream banks, under fallen logs, or within roots of an upturned tree.		1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005)
Kentucky Warbler	<i>Oporornis formosus</i>	100,000	Dense understory of mature humid deciduous and Northern hardwood forests	Insects	Ground	Sensitive to habitat fragmentation and cowbird parasitism	1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (WVDNR 2005)
Canada Warbler	<i>Wilsonia canadensis</i>	20,000	Mixed coniferous and deciduous trees with a dense understory	Insects	Ground		1,2,3,4	Not Likely to Occur	(Partners in Flight Science Committee 2013), (Conway 1999), (WVDNR 2005)

Bald Eagle	<i>Haliaeetus leucocephalus</i>		Near estuaries, lakes, rivers and reservoirs	Fish, waterfowl, turtles, rabbits, snakes and carrion	Tall trees or structures	Hunters, collisions with motor vehicles and stationary structures, and destruction of shoreline nesting, perching, roosting and foraging habitats	1,2	Likely to Occur	(Buehler 2000)
Peregrine Falcon	<i>Falco peregrinus</i>		Along mountain ranges, river valleys and coastlines	Songbirds, shorebirds and ducks	Cliffs or manmade structures		1,2,3	Likely to Occur	(White et al. 2002)
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	300	Mixed hardwood forests, woodlots and orchards	Sap, insects, fruits, berries and tree buds	Cavities			Not Likely to Occur	(Partners in Flight Science Committee 2013), (Buckelew 1994), (Walters et al. 2002)

APPENDIX B

State Imperiled Species of the Bluestone National Scenic River, New River Gorge
National River, and the Gauley River National Recreation Area

Park Name	Taxa Category	Scientific Name	Common Name	State Rank	Global Rank
Bluestone National Scenic River	Amphibian	<i>Ambystoma jeffersonianum</i>	Jefferson's salamander	S2	G4
Bluestone National Scenic River	Amphibian	<i>Aneides aeneus</i>	green salamander	S3	G3G4
Bluestone National Scenic River	Amphibian	<i>Desmognathus quadramaculatus</i>	black-bellied salamander	S3	G5
Bluestone National Scenic River	Amphibian	<i>Eurycea lucifuga</i>	cave salamander	S3	G5
Bluestone National Scenic River	Amphibian	<i>Pseudotriton ruber</i>	Northern red salamander	S3	G5
Bluestone National Scenic River	Bird	<i>Accipiter cooperii</i>	Cooper's hawk	S3	G5
Bluestone National Scenic River	Bird	<i>Accipiter striatus</i>	sharp-shinned hawk	S3	G5
Bluestone National Scenic River	Bird	<i>Actitis macularia</i>	spotted sandpiper	S3B	G5
Bluestone National Scenic River	Bird	<i>Ammodramus savannarum</i>	grasshopper sparrow	S3B	G5
Bluestone National Scenic River	Bird	<i>Anas crecca</i>	green-winged teal	S2N	G5
Bluestone National Scenic River	Bird	<i>Anas rubripes</i>	American black duck	S2BS4N	G5
Bluestone National Scenic River	Bird	<i>Ardea herodias</i>	great blue heron	S3BS4N	G5
Bluestone National Scenic River	Bird	<i>Botaurus lentiginosus</i>	American bittern	S1BS1N	G4
Bluestone National Scenic River	Bird	<i>Catharus ustulatus</i>	Swainson's thrush	S3B	G5
Bluestone National Scenic River	Bird	<i>Circus cyaneus</i>	Northern harrier	S1BS3N	G5
Bluestone National Scenic River	Bird	<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	S3	G5
Bluestone National Scenic River	Bird	<i>Contopus virens</i>	Eastern wood peewee	S5B	G5
Bluestone National Scenic River	Bird	<i>Coragyps atratus</i>	black vulture	S3BS4N	G5
Bluestone National Scenic River	Bird	<i>Dendroica cerulea</i>	cerulean warbler	S4B	G4
Bluestone National Scenic River	Bird	<i>Dendroica coronata</i>	yellow-rumped warbler	S3BS3N	G5

Bluestone National Scenic River	Bird	<i>Dendroica discolor</i>	prairie warbler		G5
Bluestone National Scenic River	Bird	<i>Dendroica fusca</i>	Blackburnian warbler	S3B	G5
Bluestone National Scenic River	Bird	<i>Dolichonyx oryzivorus</i>	bobolink	S3B	G5
Bluestone National Scenic River	Bird	<i>Empidonax virescens</i>	Acadian flycatcher	S5B	G5
Bluestone National Scenic River	Bird	<i>Eremophila alpestris</i>	horned lark	S2BS3N	G5
Bluestone National Scenic River	Bird	<i>Falco peregrinus</i>	peregrine falcon	S1BS2N	G4
Bluestone National Scenic River	Bird	<i>Fulica americana</i>	American coot	S1BS3N	G5
Bluestone National Scenic River	Bird	<i>Haliaeetus leucocephalus</i>	bald eagle	S2BS3N	G5
Bluestone National Scenic River	Bird	<i>Helmitheros vermivorus</i>	worm-eating warbler	S5B	G5
Bluestone National Scenic River	Bird	<i>Hylocichla mustelina</i>	wood thrush	S5B	G5
Bluestone National Scenic River	Bird	<i>Limnothlypis swainsonii</i>	Swainson's warbler	S3B	G4
Bluestone National Scenic River	Bird	<i>Lophodytes cucullatus</i>	hooded merganser	S1BS4N	G5
Bluestone National Scenic River	Bird	<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	S2BS3N	G5
Bluestone National Scenic River	Bird	<i>Pandion haliaetus</i>	osprey	S2B	G5
Bluestone National Scenic River	Bird	<i>Petrochelidon pyrrhonota</i>	cliff swallow	S3B	G5
Bluestone National Scenic River	Bird	<i>poocetes gramineus</i>	vesper sparrow	S3BS2N	G5
Bluestone National Scenic River	Bird	<i>Protonotaria citrea</i>	prothonotary warbler	S2B	G5
Bluestone National Scenic River	Bird	<i>Riparia riparia</i>	bank swallow	S2B	G5
Bluestone National Scenic River	Bird	<i>Scopolax minor</i>	American woodcock	S4BS4N	G5
Bluestone National Scenic River	Bird	<i>Seiurus motacilla</i>	Louisiana waterthrush	S5B	G5

Bluestone National Scenic River	Bird	<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	S1BS3N	G5
Bluestone National Scenic River	Bird	<i>Spiza americana</i>	dickcissel	S2B	G5
Bluestone National Scenic River	Bird	<i>Spizella pusilla</i>	field sparrow	S4BS4N	G5
Bluestone National Scenic River	Bird	<i>Vermivora chrysoptera</i>	golden-winged warbler	S2B	G4
Bluestone National Scenic River	Bird	<i>Vermivora pinus</i>	blue-winged warbler	S4B	G5
Bluestone National Scenic River	Bird	<i>Vermivora ruficapilla</i>	Nashville warbler	S1B	G5
Bluestone National Scenic River	Bird	<i>Wilsonia canadensis</i>	Canada warbler		G5
Bluestone National Scenic River	Invertebrate	<i>Alasmidonta marginata</i>	Elk toe	S2	G4
Bluestone National Scenic River	Invertebrate	<i>Calephelis borealis</i>	Northern metalmark	S2	G3G4
Bluestone National Scenic River	Invertebrate	<i>Cicindela unipunctata</i>	a tiger beetle	S3	G4G5
Bluestone National Scenic River	Invertebrate	<i>Cyclonaias tuberculata</i>	Purple wartyback	S1	G5
Bluestone National Scenic River	Invertebrate	<i>Hendersonia occulta</i>	cheerystone drop	S2	G4
Bluestone National Scenic River	Invertebrate	<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel	S1	G3G4
Bluestone National Scenic River	Invertebrate	<i>Lampsilis ovata</i>	Pocketbook	S1	G5
Bluestone National Scenic River	Invertebrate	<i>Lasmigona subviridis</i>	Green floater	S2	G3
Bluestone National Scenic River	Invertebrate	<i>Toxolasma parvus</i>	Lilliput	S2	G5
Bluestone National Scenic River	Invertebrate	<i>Tritogonia verrucosa</i>	pistolgrip	S2	G4G5
Bluestone National Scenic River	Invertebrate	<i>Villosa iris</i>	Rainbow	S2	G5
Bluestone National Scenic River	Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	S1	G3G4
Bluestone National Scenic River	Mammal	<i>Cryptotis parva</i>	least shrew	S2	G5
Bluestone National Scenic River	Mammal	<i>Lasionycteris noctivagans</i>	silver-haired bat	S2	G5
Bluestone National Scenic River	Mammal	<i>Lasiurus borealis</i>	Eastern red bat		G5
Bluestone National Scenic River	Mammal	<i>Lasiurus cinereus</i>	hoary bat		G5

Bluestone National Scenic River	Mammal	<i>Myotis leibii</i>	Eastern small-footed bat	S1	G3
Bluestone National Scenic River	Mammal	<i>Neotoma magister</i>	Allegheny woodrat	S3	G3G4
Bluestone National Scenic River	Mammal	<i>Nycticeius humeralis</i>	evening bat	S1	G5
Bluestone National Scenic River	Mammal	<i>Ochrotomys nuttalli</i>	golden mouse	S2	G5
Bluestone National Scenic River	Mammal	<i>Sorex dispar</i>	long-tailed shrew	S2S3	G4
Bluestone National Scenic River	Mammal	<i>Sorex hoyi</i>	pygmy shrew	S2S3	G5
Bluestone National Scenic River	Mammal	<i>Synaptomys cooperi</i>	Southern bog lemming	S3	G5
Bluestone National Scenic River	Mammal	<i>Zapus hudsonius</i>	meadow jumping mouse	S3	G5
Bluestone National Scenic River	Reptile	<i>Opheodrys aestivus</i>	rough green snake	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Agrimonia microcarpa</i>	smallfruit agrimony	S1	G5
Bluestone National Scenic River	Vascular Plant	<i>Allium oxyphilum</i>	Lillydale onion	S2	G2Q
Bluestone National Scenic River	Vascular Plant	<i>Anemone canadensis</i>	Canadian anemone	S1	G5
Bluestone National Scenic River	Vascular Plant	<i>Anemone quinquefolia var. minima</i>	nightcaps	S2	G5T3
Bluestone National Scenic River	Vascular Plant	<i>Berberis canadensis</i>	American barberry	S1	G3
Bluestone National Scenic River	Vascular Plant	<i>Calycanthus floridus var. glaucus</i>	eastern sweetshrub	SH	G5T5
Bluestone National Scenic River	Vascular Plant	<i>Cardamine flagellifera var. flagellifera</i>	Blue Ridge bittercress	S2	G3
Bluestone National Scenic River	Vascular Plant	<i>Carex aggregata</i>	glomerate sedge	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Carex cumberlandensis</i>	Cumberland sedge	S2	GNR
Bluestone National Scenic River	Vascular Plant	<i>Carex emoryi</i>	Emory's sedge	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Carex hirtifolia</i>	pubescent sedge	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Carex molesta</i>	troublesome sedge	S3	G4
Bluestone National Scenic River	Vascular Plant	<i>Carex normalis</i>	greater straw sedge	S3	G5

Bluestone National Scenic River	Vascular Plant	<i>Carex tenera</i>	quill sedge	S1	G5
Bluestone National Scenic River	Vascular Plant	<i>Carex typhina</i>	cattail sedge	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Carex woodii</i>	pretty sedge	S2	G4
Bluestone National Scenic River	Vascular Plant	<i>Eleocharis palustris</i>	common spikerush	S3	G5
Bluestone National Scenic River	Vascular Plant	<i>Goodyera repens</i>	lesser rattlesnake plantain	S1S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Hasteola suaveolens</i>	false Indian plantain	S3	G3
Bluestone National Scenic River	Vascular Plant	<i>Helianthus laevigatus</i>	smooth sunflower	S2	G4
Bluestone National Scenic River	Vascular Plant	<i>Heuchera americana</i> var. <i>hispida</i>	Rough alumroot	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Juglans cinerea</i>	butternut	S3	G3G4
Bluestone National Scenic River	Vascular Plant	<i>Juncus dichotomus</i>	forked rush	S1	G5
Bluestone National Scenic River	Vascular Plant	<i>Lemna valdiviana</i>	valdivia duckweed	S3	G5
Bluestone National Scenic River	Vascular Plant	<i>Lonicera canadensis</i>	American fly honeysuckle	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Lysimachia tonsa</i>	southern yellow loosestrife	SH	G4
Bluestone National Scenic River	Vascular Plant	<i>Monarda fistulosa</i> ssp. <i>brevis</i>	wild bergamot	S1	G5T1
Bluestone National Scenic River	Vascular Plant	<i>Myosotis macrosperma</i>	largeseed forget-me-not	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Prunus alleghaniensis</i> var. <i>alleghaniensis</i>	Allegheny plum	S3	G4T4
Bluestone National Scenic River	Vascular Plant	<i>Ribes lacustre</i>	prickly currant	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Scutellaria saxatilis</i>	smooth rock skullcap	S2	G3
Bluestone National Scenic River	Vascular Plant	<i>Spiraea virginiana</i>	Virginia meadowsweet	S1	G2
Bluestone National Scenic River	Vascular Plant	<i>Stachys nuttallii</i>	heartleaf hedgenettle	S3	G5?
Bluestone National Scenic River	Vascular Plant	<i>Stachys tenuifolia</i>	smooth hedgenettle	S3	G5
Bluestone National Scenic River	Vascular Plant	<i>Taxus canadensis</i>	Canada yew	S2S3	G5
Bluestone National Scenic River	Vascular Plant	<i>Thuja occidentalis</i>	White cedar	S2	G5

Bluestone National Scenic River	Vascular Plant	<i>Trifolium reflexum</i>	buffalo clover	S1	G3G4
Bluestone National Scenic River	Vascular Plant	<i>Viburnum rafinesquianum</i>	downy arrowwood	S2	G5
Bluestone National Scenic River	Vascular Plant	<i>Viburnum rufidulum</i>	rusty blackhaw	S1	G5
Bluestone National Scenic River	Vascular Plant	<i>Vitis rupestris</i>	sand grape	S2	G3
New River Gorge National River	Amphibian	<i>Ambystoma jeffersonianum</i>	Jefferson's salamander	S2	G4
New River Gorge National River	Amphibian	<i>Aneides aeneus</i>	green salamander	S3	G3G4
New River Gorge National River	Amphibian	<i>Desmognathus quadramaculatus</i>	black-bellied salamander	S3	G5
New River Gorge National River	Amphibian	<i>Eurycea lucifuga</i>	cave salamander	S3	G5
New River Gorge National River	Amphibian	<i>Pseudotriton montanus diastictus</i>	Midland mud salamander	S1	G5
New River Gorge National River	Amphibian	<i>Pseudotriton ruber</i>	Northern red salamander	S3	G5
New River Gorge National River	Bird	<i>Accipiter cooperii</i>	Cooper's hawk	S3	G5
New River Gorge National River	Bird	<i>Accipiter striatus</i>	sharp-shinned hawk	S3	G5
New River Gorge National River	Bird	<i>Actitis macularia</i>	spotted sandpiper	S3B	G5
New River Gorge National River	Bird	<i>Ammodramus savannarum</i>	grasshopper sparrow	S3B	G5
New River Gorge National River	Bird	<i>Anas crecca</i>	green-winged teal	S2N	G5
New River Gorge National River	Bird	<i>Anas rubripes</i>	American black duck	S2BS4N	G5
New River Gorge National River	Bird	<i>Ardea herodias</i>	great blue heron	S3BS4N	G5
New River Gorge National River	Bird	<i>Botaurus lentiginosus</i>	American bittern	S1BS1N	G4
New River Gorge National River	Bird	<i>Catharus ustulatus</i>	Swainson's thrush	S3B	G5
New River Gorge National River	Bird	<i>Circus cyaneus</i>	Northern harrier	S1BS3N	G5
New River Gorge National River	Bird	<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	S3	G5

New River Gorge National River	Bird	<i>Contopus virens</i>	Eastern wood peewee	S5B	G5
New River Gorge National River	Bird	<i>Coragyps atratus</i>	black vulture	S3BS4N	G5
New River Gorge National River	Bird	<i>Dendroica cerulea</i>	cerulean warbler	S4B	G4
New River Gorge National River	Bird	<i>Dendroica coronata</i>	yellow-rumped warbler	S3BS3N	G5
New River Gorge National River	Bird	<i>Dendroica discolor</i>	prairie warbler		G5
New River Gorge National River	Bird	<i>Dendroica fusca</i>	Blackburnian warbler	S3B	G5
New River Gorge National River	Bird	<i>Dolichonyx oryzivorus</i>	bobolink	S3B	G5
New River Gorge National River	Bird	<i>Empidonax virescens</i>	Acadian flycatcher	S5B	G5
New River Gorge National River	Bird	<i>Eremophila alpestris</i>	horned lark	S2BS3N	G5
New River Gorge National River	Bird	<i>Falco peregrinus</i>	peregrine falcon	S1BS2N	G4
New River Gorge National River	Bird	<i>Fulica americana</i>	American coot	S1BS3N	G5
New River Gorge National River	Bird	<i>Haliaeetus leucocephalus</i>	bald eagle	S2BS3N	G5
New River Gorge National River	Bird	<i>Helmitheros vermivorus</i>	worm-eating warbler	S5B	G5
New River Gorge National River	Bird	<i>Hylocichla mustelina</i>	wood thrush	S5B	G5
New River Gorge National River	Bird	<i>Limnothlypis swainsonii</i>	Swainson's warbler	S3B	G4
New River Gorge National River	Bird	<i>Lophodytes cucullatus</i>	hooded merganser	S1BS4N	G5
New River Gorge National River	Bird	<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	S2BS3N	G5
New River Gorge National River	Bird	<i>Pandion haliaetus</i>	osprey	S2B	G5
New River Gorge National River	Bird	<i>Petrochelidon pyrrhonota</i>	cliff swallow	S3B	G5
New River Gorge National River	Bird	<i>poocetes gramineus</i>	vesper sparrow	S3BS2N	G5

New River Gorge National River	Bird	<i>Protonotaria citrea</i>	prothonotary warbler	S2B	G5
New River Gorge National River	Bird	<i>Riparia riparia</i>	bank swallow	S2B	G5
New River Gorge National River	Bird	<i>Scopolax minor</i>	American woodcock	S4BS4N	G5
New River Gorge National River	Bird	<i>Seiurus motacilla</i>	Louisiana waterthrush	S5B	G5
New River Gorge National River	Bird	<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	S1BS3N	G5
New River Gorge National River	Bird	<i>Spiza americana</i>	dickcissel	S2B	G5
New River Gorge National River	Bird	<i>Spizella pusilla</i>	field sparrow	S4BS4N	G5
New River Gorge National River	Bird	<i>Vermivora chrysoptera</i>	golden-winged warbler	S2B	G4
New River Gorge National River	Bird	<i>Vermivora pinus</i>	blue-winged warbler	S4B	G5
New River Gorge National River	Bird	<i>Vermivora ruficapilla</i>	Nashville warbler	S1B	G5
New River Gorge National River	Bird	<i>Wilsonia canadensis</i>	Canada warbler		G5
New River Gorge National River	Invertebrate	<i>Alasmidonta marginata</i>	Elk toe	S2	G4
New River Gorge National River	Invertebrate	<i>Calephelis borealis</i>	Northern metalmark	S2	G3G4
New River Gorge National River	Invertebrate	<i>Cicindela unipunctata</i>	a tiger beetle	S3	G4G5
New River Gorge National River	Invertebrate	<i>Cyclonaias tuberculata</i>	Purple wartyback	S1	G5
New River Gorge National River	Invertebrate	<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel	S1	G3G4
New River Gorge National River	Invertebrate	<i>Lampsilis ovata</i>	Pocketbook	S1	G5
New River Gorge National River	Invertebrate	<i>Quadrula quadrula</i>	mapleleaf	S2	G5
New River Gorge National River	Invertebrate	<i>Speyeria diana</i>	Diana fritillary	S2S3	G3G4
New River Gorge National River	Invertebrate	<i>Toxolasma parvus</i>	Lilliput	S2	G5
New River Gorge National River	Invertebrate	<i>Tritogonia verrucosa</i>	pistolgrip	S2	G4G5
New River Gorge National River	Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	S1	G3G4
New River Gorge National River	Mammal	<i>Cryptotis parva</i>	least shrew	S2	G5

New River Gorge National River	Mammal	<i>Lasionycteris noctivagans</i>	silver-haired bat	S2	G5
New River Gorge National River	Mammal	<i>Lasiurus borealis</i>	Eastern red bat		G5
New River Gorge National River	Mammal	<i>Lasiurus cinereus</i>	hoary bat		G5
New River Gorge National River	Mammal	<i>Myotis leibii</i>	Eastern small-footed bat	S1	G3
New River Gorge National River	Mammal	<i>Neotoma magister</i>	Allegheny woodrat	S3	G3G4
New River Gorge National River	Mammal	<i>Nycticeius humeralis</i>	evening bat	S1	G5
New River Gorge National River	Mammal	<i>Ochrotomys nuttalli</i>	golden mouse	S2	G5
New River Gorge National River	Mammal	<i>Sorex dispar</i>	long-tailed shrew	S2S3	G4
New River Gorge National River	Mammal	<i>Sorex hoyi</i>	pygmy shrew	S2S3	G5
New River Gorge National River	Mammal	<i>Synaptomys cooperi</i>	Southern bog lemming	S3	G5
New River Gorge National River	Mammal	<i>Zapus hudsonius</i>	meadow jumping mouse	S3	G5
New River Gorge National River	Reptile	<i>Crotalus horridus</i>	timber rattlesnake	S3	G4
New River Gorge National River	Reptile	<i>Eumeces laticeps</i>	broad-headed skink	S2	G5
New River Gorge National River	Reptile	<i>Glyptemys insculpta</i>	wood turtle	S3	G4
New River Gorge National River	Reptile	<i>Opheodrys aestivus</i>	rough green snake	S2	G5
New River Gorge National River	Reptile	<i>Pseudemys concinna</i>	river cooter	S2	G5
New River Gorge National River	Vascular Plant	<i>Adlumia fungosa</i>	climbing fumitory	S2?	G4
New River Gorge National River	Vascular Plant	<i>Anemone quinquefolia var. minima</i>	dwarf anemone	S2	G5T3
New River Gorge National River	Vascular Plant	<i>Arabis hirsuta var. pycnocarpa</i>	hairy rock-cress	S2	G5
New River Gorge National River	Vascular Plant	<i>Arabis patens</i>	spreading rock-cress	S2	G3
New River Gorge National River	Vascular Plant	<i>Aristida purpurascens var. purpurascens</i>	purple needlegrass	S1	G5

New River Gorge National River	Vascular Plant	<i>Baptisia australis</i> var. <i>australis</i>	wild false indigo	S3	G5
New River Gorge National River	Vascular Plant	<i>Calopogon tuberosus</i> var. <i>tuberosus</i>	grass pink	S1	G5
New River Gorge National River	Vascular Plant	<i>Cardamine flagellifera</i>	bitter cress	S1S2	G3
New River Gorge National River	Vascular Plant	<i>Carex aestivalis</i>	summer sedge	S2	G4
New River Gorge National River	Vascular Plant	<i>Carex appalachia</i>	Appalachian sedge	S2	G4
New River Gorge National River	Vascular Plant	<i>Carex careyana</i>	Carey's sedge	S1	G4
New River Gorge National River	Vascular Plant	<i>Carex comosa</i>	bearded sedge	S2	G5
New River Gorge National River	Vascular Plant	<i>Carex cumberlandensis</i>	Cumberland's sedge	S1	GNR
New River Gorge National River	Vascular Plant	<i>Carex emoryi</i>	Emory's sedge	S2	G5
New River Gorge National River	Vascular Plant	<i>Carex interior</i>	inland sedge	S1	G5
New River Gorge National River	Vascular Plant	<i>Carex laxiculmis</i> var. <i>copulata</i>	spreading sedge	S1	G5T3T5
New River Gorge National River	Vascular Plant	<i>Carex mesochorea</i>	midland sedge	S2	G4G5
New River Gorge National River	Vascular Plant	<i>Carex molesta</i>	troublesome sedge	S3	G4
New River Gorge National River	Vascular Plant	<i>Carex nigromarginata</i>	black-edge sedge	S3	G5
New River Gorge National River	Vascular Plant	<i>Carex seorsa</i>	wesk stellate sedge	S1	G4
New River Gorge National River	Vascular Plant	<i>Carex styloflexa</i>	bent sedge	S1	G4G5
New River Gorge National River	Vascular Plant	<i>Carex suberecta</i>	praire straw sedge	S1	G4
New River Gorge National River	Vascular Plant	<i>Carex tonsa</i> var. <i>rugosperma</i>	shaved sedge	S2S3	G5
New River Gorge National River	Vascular Plant	<i>Carex typhina</i>	cat-tail sedge	S2	G5
New River Gorge National River	Vascular Plant	<i>Carex woodii</i>	pretty sedge	S2	G4
New River Gorge National River	Vascular Plant	<i>Commelina erecta</i> var. <i>angustifolia</i>	slender day-flower	S2	G5
New River Gorge National River	Vascular Plant	<i>Corallorhiza wisteriana</i>	spring coralroot	S1	G5

New River Gorge National River	Vascular Plant	<i>Coreopsis pubescens</i> <i>var. robusta</i>	star tickseed	S2	G5?T3T5
New River Gorge National River	Vascular Plant	<i>Croton glandulosus</i> <i>var. septentrionalis</i>	northern croton	S3	G5T5
New River Gorge National River	Vascular Plant	<i>Cuscuta indecora</i> <i>var. neuropetala</i>	pretty dodder	S1	G5T5
New River Gorge National River	Vascular Plant	<i>Cymophyllus fraserianus</i>	Fraser's sedge	S3	G4
New River Gorge National River	Vascular Plant	<i>Cyperus refractus</i>	reflexed flatsedge	S3	G5
New River Gorge National River	Vascular Plant	<i>Cyperus squarrosus</i>	awned cyperus	S3	G5
New River Gorge National River	Vascular Plant	<i>Danthonia sericea</i>	downy danthonia	S1	G5?
New River Gorge National River	Vascular Plant	<i>Desmodium lineatum</i>	sand tick-trefoil	S1	G5
New River Gorge National River	Vascular Plant	<i>Desmodium pauciflorum</i>	fewflower tick-trefoil	S1	G5
New River Gorge National River	Vascular Plant	<i>Dichanthelium acuminatum</i> subsp. <i>columbianum</i>	American panic grass	S1	G5
New River Gorge National River	Vascular Plant	<i>Eleocharis compressa</i>	flat-stemmed spike-rush	S2	G4
New River Gorge National River	Vascular Plant	<i>Eleocharis intermedia</i>	matted spike-rush	S1	G5
New River Gorge National River	Vascular Plant	<i>Eleocharis palustris</i>	creeping spike-rush	S3	G5
New River Gorge National River	Vascular Plant	<i>Eriogonum allenii</i>	yellow buckwheat	S2	G4
New River Gorge National River	Vascular Plant	<i>Eupatorium godfreyanum</i>	godfrey's boneset	S2S3	G4
New River Gorge National River	Vascular Plant	<i>Eupatorium pilosum</i>	vervain thoroughwort	S2	G5
New River Gorge National River	Vascular Plant	<i>Fibristylis annua</i>	annual fimbry	S1	G5
New River Gorge National River	Vascular Plant	<i>Galactia volubilis</i>	downy milkpea	S2	G5
New River Gorge National River	Vascular Plant	<i>Gentiana austromontana</i>	Appalachian gentian	S1	G3
New River Gorge National River	Vascular Plant	<i>Helianthemum canadense</i>	Canada frostweed	S2	G5
New River Gorge National River	Vascular Plant	<i>Helianthus laevigatus</i>	smooth sunflower	S2	G4

New River Gorge National River	Vascular Plant	<i>Helianthus occidentalis</i> ssp. <i>Occidentalis</i>	McDowell sunflower	S2	G5T5
New River Gorge National River	Vascular Plant	<i>Hibiscus laevis</i>	halbred-leaved mallow	S2	G5
New River Gorge National River	Vascular Plant	<i>Hypericum virgatum</i>	coppery St. John's-wort	S1	G4?
New River Gorge National River	Vascular Plant	<i>Juncus dichotomus</i>	forked rush	S1	G5
New River Gorge National River	Vascular Plant	<i>Lythrum alatum</i> var. <i>alatum</i>	winged-loosestrife	S2	G5T5
New River Gorge National River	Vascular Plant	<i>Maianthemum stellatum</i>	starflower false Solomon's-seal	S2	G5
New River Gorge National River	Vascular Plant	<i>Melica mutica</i>	two-flower melic grass	S2	G5
New River Gorge National River	Vascular Plant	<i>Myosotis macrosperma</i>	largeseed forget-me-not	S2	G5
New River Gorge National River	Vascular Plant	<i>Najas gracillima</i>	slender water nymph	S2	G5?
New River Gorge National River	Vascular Plant	<i>Oenothera pilosella</i>	evening-primrose	S2	G5T5?
New River Gorge National River	Vascular Plant	<i>Pinus resinosa</i>	red pine	S1	G5
New River Gorge National River	Vascular Plant	<i>Piptochaetium avenaceum</i>	blackseed needlegrass	S1	G5
New River Gorge National River	Vascular Plant	<i>Platanthera ciliaris</i>	yellow fringed orchid	S3	G5
New River Gorge National River	Vascular Plant	<i>Platanthera psycodes</i>	small purple-fringe orchid	S1	G5
New River Gorge National River	Vascular Plant	<i>Poa saltuensis</i>	drooping bluegrass	S1	G5
New River Gorge National River	Vascular Plant	<i>Pogonia ophioglossoides</i>	rose pogonia	S2	G5
New River Gorge National River	Vascular Plant	<i>Polygala curtissii</i>	Curtiss' milkwort	S2	G5
New River Gorge National River	Vascular Plant	<i>Polygonum amphibium</i> var. <i>emersum</i>	water smartweed	S2S3	G5T5
New River Gorge National River	Vascular Plant	<i>Pycnanthemum loomisii</i>	Loomis' mountain-mint	S2	G4?
New River Gorge National River	Vascular Plant	<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	S1	G2
New River Gorge National River	Vascular Plant	<i>Ranunculus pensylvanicus</i>	Pennsylvania buttercup	S1	G5
New River Gorge National River	Vascular Plant	<i>Ranunculus pusillus</i> var. <i>pusillus</i>	low spearwort	S1	G5T4?

New River Gorge National River	Vascular Plant	<i>Rhynchospora recognita</i>	globe beaked-rush	S2	G5?
New River Gorge National River	Vascular Plant	<i>Salix lucida ssp Lucida</i>	shining willow	S1	G5T5
New River Gorge National River	Vascular Plant	<i>Saxifraga careyana</i>	Carey saxifrage	S3	G3
New River Gorge National River	Vascular Plant	<i>Schoenoplectus purshianus</i>	weakstalk bulrush	S3	G4G5
New River Gorge National River	Vascular Plant	<i>Scutellaria saxatilis</i>	rock skullcap	S2	G3
New River Gorge National River	Vascular Plant	<i>Sibara virginica</i>	Virginia cress	S2?	G5
New River Gorge National River	Vascular Plant	<i>Sida hermaphrodita</i>	Virginia mallow	S2	G3
New River Gorge National River	Vascular Plant	<i>Silene nivea</i>	snowy campion	S1	G4
New River Gorge National River	Vascular Plant	<i>Silphium perfoliatum var. connatum</i>	Virginia cup-plant	S1	G5T3T4
New River Gorge National River	Vascular Plant	<i>Solidago simplex ssp randii</i>	Rand's goldenrod	S1	G5T4T5
New River Gorge National River	Vascular Plant	<i>Spiranthes ovalis var. erostellata</i>	oval ladies'-tresses	S1	G5?T4?
New River Gorge National River	Vascular Plant	<i>Spiranthes tuberosa</i>	little ladies'-tresses	S3	G5
New River Gorge National River	Vascular Plant	<i>Sporobolus clandestinus</i>	rough dropseed	S1	G5
New River Gorge National River	Vascular Plant	<i>Stachys nuttallii</i>	Nuttall's hedge-nettle	S3	G5?
New River Gorge National River	Vascular Plant	<i>Stachys tenuifolia var tenuifoia</i>	smooth hedge-nettle	S3	G5
New River Gorge National River	Vascular Plant	<i>Thalictrum clavatum</i>	mountain meadow-rue	S1	G4
New River Gorge National River	Vascular Plant	<i>Triphora trianthophora</i>	nodding pogonia	S2	G4
New River Gorge National River	Vascular Plant	<i>Viburnum rufidulum</i>	rusty blackhaw	S1	G5
New River Gorge National River	Vascular Plant	<i>Vitis rupestris</i>	sand grape	S2	G3
Gauley River National Recreation Area	Amphibian	<i>Ambystoma jeffersonianum</i>	Jefferson's salamander	S2	G4
Gauley River National Recreation Area	Amphibian	<i>Aneides aeneus</i>	green salamander	S3	G3G4

Gauley River National Recreation Area	Amphibian	<i>Cryptobranchus alleganiensis</i>	Eastern hellbender	S2	G4
Gauley River National Recreation Area	Amphibian	<i>Desmognathus quadramaculatus</i>	black-bellied salamander	S3	G5
Gauley River National Recreation Area	Amphibian	<i>Eurycea lucifuga</i>	cave salamander	S3	G5
Gauley River National Recreation Area	Amphibian	<i>Pseudotriton ruber</i>	Northern red salamander	S3	G5
Gauley River National Recreation Area	Bird	<i>Accipiter cooperii</i>	Cooper's hawk	S3	G5
Gauley River National Recreation Area	Bird	<i>Accipiter striatus</i>	sharp-shinned hawk	S3	G5
Gauley River National Recreation Area	Bird	<i>Actitis macularia</i>	spotted sandpiper	S3B	G5
Gauley River National Recreation Area	Bird	<i>Anas crecca</i>	green-winged teal	S2N	G5
Gauley River National Recreation Area	Bird	<i>Anas rubripes</i>	American black duck	S2BS4N	G5
Gauley River National Recreation Area	Bird	<i>Ardea herodias</i>	great blue heron	S3BS4N	G5
Gauley River National Recreation Area	Bird	<i>Botaurus lentiginosus</i>	American bittern	S1BS1N	G4
Gauley River National Recreation Area	Bird	<i>Catharus ustulatus</i>	Swainson's thrush	S3B	G5
Gauley River National Recreation Area	Bird	<i>Circus cyaneus</i>	Northern harrier	S1BS3N	G5
Gauley River National Recreation Area	Bird	<i>Coccyzus erythrophthalmus</i>	black-billed cuckoo	S3	G5
Gauley River National Recreation Area	Bird	<i>Contopus virens</i>	Eastern wood peewee	S5B	G5
Gauley River National Recreation Area	Bird	<i>Coragyps atratus</i>	black vulture	S3BS4N	G5
Gauley River National Recreation Area	Bird	<i>Dendroica cerulea</i>	cerulean warbler	S4B	G4
Gauley River National Recreation Area	Bird	<i>Dendroica coronata</i>	yellow-rumped warbler	S3BS3N	G5
Gauley River National Recreation Area	Bird	<i>Dendroica discolor</i>	prairie warbler		G5
Gauley River National Recreation Area	Bird	<i>Dendroica fusca</i>	Blackburnian warbler	S3B	G5
Gauley River National Recreation Area	Bird	<i>Dolichonyx oryzivorus</i>	bobolink	S3B	G5

Gauley River National Recreation Area	Bird	<i>Empidonax virescens</i>	Acadian flycatcher	S5B	G5
Gauley River National Recreation Area	Bird	<i>Eremophila alpestris</i>	horned lark	S2BS3N	G5
Gauley River National Recreation Area	Bird	<i>Falco peregrinus</i>	peregrine falcon	S1BS2N	G4
Gauley River National Recreation Area	Bird	<i>Fulica americana</i>	American coot	S1BS3N	G5
Gauley River National Recreation Area	Bird	<i>Haliaeetus leucocephalus</i>	bald eagle	S2BS3N	G5
Gauley River National Recreation Area	Bird	<i>Helmitheros vermivorus</i>	worm-eating warbler	S5B	G5
Gauley River National Recreation Area	Bird	<i>Hylocichla mustelina</i>	wood thrush	S5B	G5
Gauley River National Recreation Area	Bird	<i>Limnothlypis swainsonii</i>	Swainson's warbler	S3B	G4
Gauley River National Recreation Area	Bird	<i>Lophodytes cucullatus</i>	hooded merganser	S1BS4N	G5
Gauley River National Recreation Area	Bird	<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	S2BS3N	G5
Gauley River National Recreation Area	Bird	<i>Petrochelidon pyrrhonota</i>	cliff swallow	S3B	G5
Gauley River National Recreation Area	Bird	<i>poocetes gramineus</i>	vesper sparrow	S3BS2N	G5
Gauley River National Recreation Area	Bird	<i>Protonotaria citrea</i>	prothonotary warbler	S2B	G5
Gauley River National Recreation Area	Bird	<i>Riparia riparia</i>	bank swallow	S2B	G5
Gauley River National Recreation Area	Bird	<i>Scopolax minor</i>	American woodcock	S4BS4N	G5
Gauley River National Recreation Area	Bird	<i>Seiurus motacilla</i>	Louisiana waterthrush	S5B	G5
Gauley River National Recreation Area	Bird	<i>Sphyrapicus varius</i>	yellow-bellied sapsucker	S1BS3N	G5
Gauley River National Recreation Area	Bird	<i>Spizella pusilla</i>	field sparrow	S4BS4N	G5
Gauley River National Recreation Area	Bird	<i>Vermivora ruficapilla</i>	Nashville warbler	S1B	G5
Gauley River National Recreation Area	Bird	<i>Wilsonia canadensis</i>	Canada warbler		G5

Gauley River National Recreation Area	Invertebrate	<i>Cambarus elkensi</i>	Elk River crayfish	S1	G2
Gauley River National Recreation Area	Invertebrate	<i>Lampsilis cariosa</i>	Yellow lampmussel	S1	G3G4
Gauley River National Recreation Area	Invertebrate	<i>Lasmigona subviridis</i>	Green floater	S2	G3
Gauley River National Recreation Area	Invertebrate	<i>Speyeria diana</i>	Diana fritillary	S2S3	G3G4
Gauley River National Recreation Area	Mammal	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	S1	G3G4
Gauley River National Recreation Area	Mammal	<i>Cryptotis parva</i>	least shrew	S2	G5
Gauley River National Recreation Area	Mammal	<i>Lasionycteris noctivagans</i>	silver-haired bat	S2	G5
Gauley River National Recreation Area	Mammal	<i>Lasiurus borealis</i>	Eastern red bat		G5
Gauley River National Recreation Area	Mammal	<i>Lasiurus cinereus</i>	hoary bat		G5
Gauley River National Recreation Area	Mammal	<i>Myotis leibii</i>	Eastern small-footed bat	S1	G3
Gauley River National Recreation Area	Mammal	<i>Neotoma magister</i>	Allegheny woodrat	S3	G3G4
Gauley River National Recreation Area	Mammal	<i>Nycticeius humeralis</i>	evening bat	S1	G5
Gauley River National Recreation Area	Mammal	<i>Ochrotomys nuttalli</i>	golden mouse	S2	G5
Gauley River National Recreation Area	Mammal	<i>Sorex dispar</i>	long-tailed shrew	S2S3	G4
Gauley River National Recreation Area	Mammal	<i>Sorex hoyi</i>	pygmy shrew	S2S3	G5
Gauley River National Recreation Area	Mammal	<i>Synaptomys cooperi</i>	Southern bog lemming	S3	G5
Gauley River National Recreation Area	Mammal	<i>Zapus hudsonius</i>	meadow jumping mouse	S3	G5
Gauley River National Recreation Area	Reptile	<i>Carphophis amoenus</i>	Worm snake	S3	G5
Gauley River National Recreation Area	Reptile	<i>Crotalus horridus</i>	timber rattlesnake	S3	G4
Gauley River National Recreation Area	Reptile	<i>Eumeces laticeps</i>	broad-headed skink	S2	G5
Gauley River National Recreation Area	Reptile	<i>Glyptemys insculpta</i>	wood turtle	S3	G4
Gauley River National Recreation Area	Reptile	<i>Opheodrys aestivus</i>	rough green snake	S2	G5

Gauley River National Recreation Area	Reptile	<i>Pseudemys concinna</i>	river cooter	S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Adlumia fungosa</i>	allegheeny vine	S2?	G4
Gauley River National Recreation Area	Vascular Plant	<i>Andropogon glomeratus</i> var. <i>glomeratus</i>	bushy bluestem	S2	G5T5
Gauley River National Recreation Area	Vascular Plant	<i>Aristida purpurascens</i> var. <i>purpurascens</i>	arrowfeather threeawn	S1	G5T5
Gauley River National Recreation Area	Vascular Plant	<i>Baptisia australis</i> var. <i>australis</i>	blue wild indigo	S3	G5TNR
Gauley River National Recreation Area	Vascular Plant	<i>Carex aestivalis</i>	summer sedge	S2	G4
Gauley River National Recreation Area	Vascular Plant	<i>Carex bromoides</i> ssp. <i>bromoides</i>	brome-like sedge	S3	G5T5
Gauley River National Recreation Area	Vascular Plant	<i>Carex cumberlandensis</i>	Cumberland sedge	S2	GNR
Gauley River National Recreation Area	Vascular Plant	<i>Carex emoryi</i>	Emory's sedge	S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Carex molesta</i>	troublesome sedge	S3	G4
Gauley River National Recreation Area	Vascular Plant	<i>Carex seorsa</i>	weak stellate sedge	S1	G4
Gauley River National Recreation Area	Vascular Plant	<i>Cymophyllus fraserianus</i>	Fraser's cymophyllus	S3	G4
Gauley River National Recreation Area	Vascular Plant	<i>Desmodium pauciflorum</i>	fewflower ticktrefoil	S1	G5
Gauley River National Recreation Area	Vascular Plant	<i>Danthonia sericea</i>	downy danthonia	S1	G5?
Gauley River National Recreation Area	Vascular Plant	<i>Dichantheium acuminatum</i> ssp. <i>columbianum</i>	hemlock rosette grass	S1	G5T5
Gauley River National Recreation Area	Vascular Plant	<i>Digitaria filiformis</i>	slender crabgrass	S1	G5
Gauley River National Recreation Area	Vascular Plant	<i>Eupatorium godfreyanum</i>	Godfrey's thoroughwort	S2S3	G4
Gauley River National Recreation Area	Vascular Plant	<i>Helianthemum bicknelii</i>	Bicknell's forstweed	S1	G5
Gauley River National Recreation Area	Vascular Plant	<i>Helianthemum propinquum</i>	low frostweed	S1	G4
Gauley River National Recreation Area	Vascular Plant	<i>Helianthuslaevigatus</i>	Smooth sunflower	S2	G4
Gauley River National Recreation Area	Vascular Plant	<i>Helianthus occidentalis</i> ssp. <i>occidentalis</i>	fewleaf sunflower	S2	G5T5

Gauley River National Recreation Area	Vascular Plant	<i>Juglans cinerea</i>	butternut	S3	G4
Gauley River National Recreation Area	Vascular Plant	<i>Lechea tenuifolia</i>	narrowleaf pinweed	S1	G5
Gauley River National Recreation Area	Vascular Plant	<i>Liatris scariosa</i> var. <i>nieuwlandii</i>	Northern blazing star	S1	G5
Gauley River National Recreation Area	Vascular Plant	<i>Liatris squarrulosa</i>	Appalachian blazing star	S1	G4G5
Gauley River National Recreation Area	Vascular Plant	<i>Liatristurgida</i>	Turgid gay-feather	S2	G3
Gauley River National Recreation Area	Vascular Plant	<i>Lygodium palmatum</i>	American climbing fern	S3	G4
Gauley River National Recreation Area	Vascular Plant	<i>Marshallia grandiflora</i>	Monongahela Barbara's buttons	S2	G2
Gauley River National Recreation Area	Vascular Plant	<i>Monarda fistulosa</i> ssp. <i>brevis</i>	wild bergamot	S1	G5T1
Gauley River National Recreation Area	Vascular Plant	<i>Myosotis macrosperma</i>	largeseed forget-me-not	S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Packera paupercula</i>	balsam groundsel	S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Polygala curtissii</i>	Curtiss' milkwort	S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Prunus pumila</i> var. <i>depressa</i>	eastern sandcherry	S1	G5T5
Gauley River National Recreation Area	Vascular Plant	<i>Rhynchospora recognita</i>	globe beaksedge	S2	G5?
Gauley River National Recreation Area	Vascular Plant	<i>Rosa blanda</i> var. <i>blanda</i>	Smooth rose	S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Rudbeckia fulgida</i> var. <i>fulgida</i>	orange coneflower	S2	G5T4?
Gauley River National Recreation Area	Vascular Plant	<i>Solidago simplex</i> ssp. <i>randii</i> var. <i>racemosa</i>	Rand's goldenrod	S2	G5T3?
Gauley River National Recreation Area	Vascular Plant	<i>Spiraea virginiana</i>	Virginia meadowsweet	S1	G2
Gauley River National Recreation Area	Vascular Plant	<i>Spiranthes lucida</i>	shining ladies'-tresses	S1S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Spiranthes vernalis</i>	spring ladies'-tresses	S3	G5
Gauley River National Recreation Area	Vascular Plant	<i>Stachys nuttallii</i>	heartleaf hedgenettle	S3	G5?
Gauley River National Recreation Area	Vascular Plant	<i>Symphyotrichum laeve</i> var. <i>concinnum</i>	smooth blue aster	S2	G5T4
Gauley River National Recreation Area	Vascular Plant	<i>Thalictrum clavatum</i>	mountain meadow-rue	S2	G4

Gauley River National Recreation Area	Vascular Plant	<i>Viburnum lentago</i>	Nannyberry	S1S2	G5
Gauley River National Recreation Area	Vascular Plant	<i>Viola appalachiensis</i>	Appalachian violet	S3	G3
Gauley River National Recreation Area	Fish	<i>Ichthyomyzon bdellium</i>	Ohio lamprey	S2	G3G4
Gauley River National Recreation Area	Fish	<i>Notropis ariommus</i>	Popeye shiner	S2	G3
Gauley River National Recreation Area	Fish	<i>Noturus stigmosus</i>	Northern madtom	S1	G3

State Ranks

State ranks are assigned by the West Virginia Natural Heritage Program and refer to the conservation status within West Virginia.

Rank Definition

S1 Five or fewer documented occurrences, or very few remaining individuals within the state.

Extremely rare and critically imperiled; or because of some factor(s) making it especially vulnerable to extirpation.

S2 Six to 20 documented occurrences, or few remaining individuals within the state. Very rare and imperiled; or because of some factor(s) making it vulnerable to extirpation.

S3 Twenty-one to 100 documented occurrences. May be somewhat vulnerable to extirpation.

S4 Common and apparently secure with more than 100 occurrences.

S5 Very common and demonstrably secure.

SH Historical. Species which have not been relocated within the last 20 years. May be rediscovered.

B Breeding population

N Non breeding population

Global Ranks

Global ranks are assigned by NatureServe and refer to the conservation status across the global range of the element.

Rank Definition

G1 Critically Imperiled - At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

G2 Imperiled - At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

G3 Vulnerable - At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

G4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

G5 Secure - Common; widespread and abundant.

GNR Not ranked

APPENDIX C

Study Area Photographs



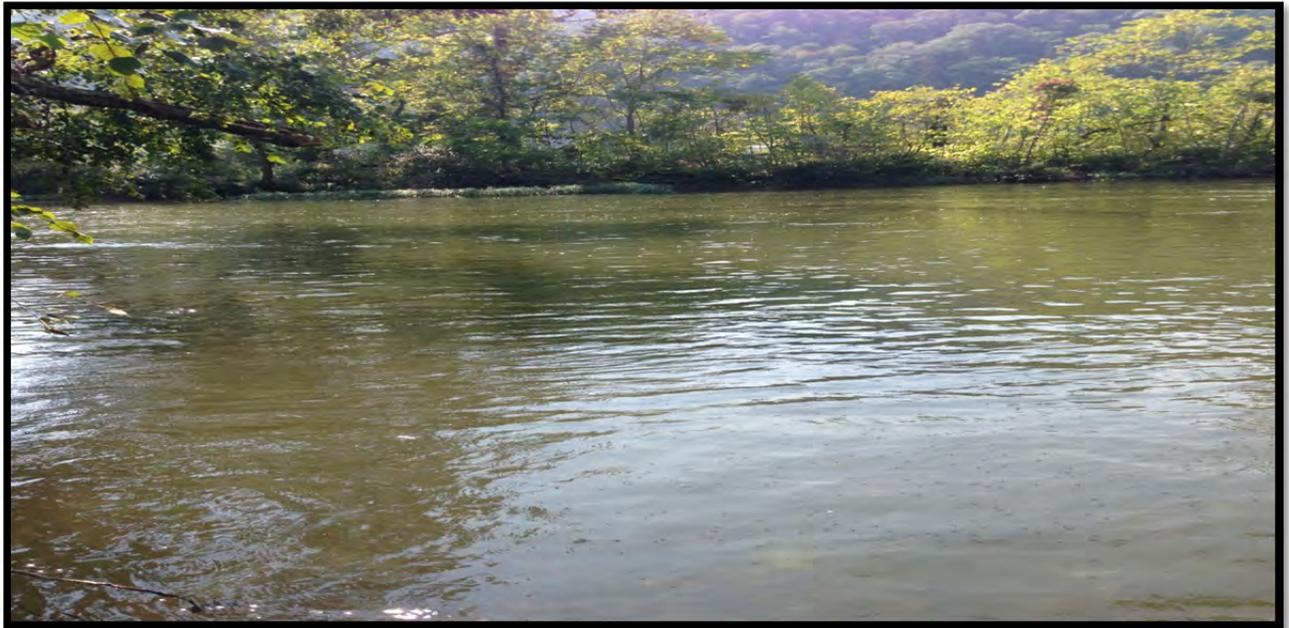
Photograph 1: Bluestone Dam (Reconnaissance Area 1).



Photograph 2: Riparian habitat to the left of Bluestone Dam, facing downstream (Reconnaissance Area 1).



Photograph 3: Boat ramp in the tailwaters of the dam (Reconnaissance Area 1).



Photograph 4: Pool-like habitat in the tailwater area (Reconnaissance Area 1).



Photograph 5: The Service measuring tree height with a clinometer (Reconnaissance Area 1).



Photograph 6: Overview of Bluestone Dam (Reconnaissance Area 1).



Photograph 7: Route 3 Bridge looking downstream from the Dam (Reconnaissance Area 1).



Photograph 8: Route 3 Bridge looking upstream, outside of the project area (Reconnaissance Area 1).



Photograph 9: The Service recording riparian field data for HEP.



Photograph 10: The Service measuring diameter at breast height for HEP (Reconnaissance Area 1).



Photograph 11: The Service categorizing substrate type in the tailwaters (Reconnaissance Area 1).



Photograph 12: Gravel and rubble substrate from the tailwaters (Reconnaissance Area 1).



Photograph 13: Look out at Brooks Island, Bald Eagle nest present (Reconnaissance Area 1).



Photograph 14: Taken at McCreery Creek fishing area in the New River Gorge (Reconnaissance Area 2).



Photograph 15: Taken at Grandview Sandbar Campground in the New River Gorge (Reconnaissance Area 2).



Photograph 16: Taken near Mill Creek in the New River Gorge (Reconnaissance Area 2).



Photograph 17: Taken from the New River Gorge Preserve (Reconnaissance Area 2).



United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241



April 19, 2016

Ms. Amy K. Frantz
Chief, Planning Branch
U.S. Army Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701

Dear Ms. Frantz:

This constitutes the U.S. Fish and Wildlife Service's (Service) Draft Mitigation Plan for the Bluestone Dam Safety Project in Summers County, West Virginia. The purpose of this preliminary mitigation plan is to provide guidance to the U.S. Army Corps of Engineers Huntington District (Corps) early in the planning process so that they can develop more detailed mitigation plans and incorporate them into the draft Environmental Impact Statement (EIS) and the Fish and Wildlife Coordination Act Report (FWCAR). This Draft Mitigation Plan is being provided under the terms of the August 2015 Scope of Services Agreement between the Corps and the Service's West Virginia Field Office.

If you have any questions regarding this Draft Mitigation Plan, please contact Tiernan Lennon of my staff at telephone (304) 636-6586, extension 12, or Tiernan_Lennon@fws.gov.

Sincerely,

John E. Schmidt
Field Supervisor

Ms. Amy K. Frantz
April 19, 2016

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cc:

USACE – Rebecca Rutherford

USACE – Megan Wilburn

WVNDR - Danny Bennett

ES:WVFO:TLenon:skd:4/19/2016

Filename: P:\Finalized Correspondence\Corps of Engineers\Bluestone Dam Safety
Project\Mitigation Plan Transmittal Letter.docx

DRAFT
MITIGATION PLAN FOR THE
BLUESTONE DAM SAFETY PROJECT
April 2016

U.S. Fish and Wildlife Service
West Virginia Field Office
Elkins, West Virginia

Overview

The purpose of this preliminary mitigation plan is to provide guidance to the U.S. Army Corps of Engineers, Huntington District (Corps), early in the planning process so that they can develop more detailed mitigation plans and incorporate them into the draft Environmental Impact Statement (EIS) and the Fish and Wildlife Coordination Act Report (FWCAR). As stated in the Fish and Wildlife Coordination Act (16 U.S.C. 661–667e) (FWCA), federal action agencies are to include justifiable means and measures for fish and wildlife, and the Service’s mitigation and enhancement recommendations are to be given full and equal consideration with other project purposes. The Service’s mitigation recommendations may include measures addressing a broad set of habitats beyond the aquatic impacts triggering the FWCA and taxa beyond those covered by other resource laws.

The U.S. Fish and Wildlife Service (Service) previously prepared a Planning Aid Letter (PAL) and a Habitat Evaluation Procedures (HEP) Report for this site to address fish and wildlife resources. The Service provided a PAL for the Bluestone Dam Safety Project on March 28, 2014, based on preliminary project information provided by the Huntington District. The PAL provided information on the fish and wildlife resources within the project site and reconnaissance areas, as well as a preliminary assessment of potential biological impacts of the proposed modification of the dam and associated habitats. While preparing the PAL, the Service also conducted a preliminary HEP assessment of existing riverine and riparian resources in the area immediately downstream of the dam. The HEP Report was intended to characterize current environmental conditions in the tailwater area immediately below the dam; our preliminary HEP Report was prepared in October 2013. The information in the HEP Report establishes the baseline environmental conditions for the project area and was used to formulate alternative risk management plans. The Corps provided us a summary of their tentatively selected alternative on March 15, 2016, and out of all the previously proposed alternatives this one is the least environmentally damaging.

The Service will be developing a more detailed FWCAR that describes the project effects and the appropriateness of the proposed mitigation in more detail.

U.S. Fish and Wildlife Service Mitigation Policy

The Service Mitigation Policy (Federal Register, Vol. 46, No. 15, 7644-7663, January 23, 1981) addresses mitigation for project impacts and is based on the sequential mitigation procedures outlined by the President’s Council on Environmental Quality (40 CFR Part 1508.20 (a-e)). Since fish and wildlife and their habitats are public resources with clear commercial, recreational, social, and ecological value to the Nation, the Service’s policy is to seek to mitigate losses of fish, wildlife, their habitats, and uses thereof, from land and water developments. The sequential mitigation procedures, as described below, are used by the Service when making recommendations for appropriate mitigation for project impacts.

The first step in the sequence is avoiding the impact; this is accomplished either by not implementing the alternative or modifying it in a way that the impact no longer occurs. In order to fully explore avoidance as a mitigation tool, analysis of feasible alternatives must be thorough. Impacts may be avoided by implementing an alternative plan that accomplishes the same objectives without causing the effects.

If avoidance is not possible and the quality of the habitat permits, the remaining steps are followed as presented: limit the magnitude or degree of the action to minimize impacts, repair or restore the affected environment to rectify the impact, use preservation and maintenance operations during the life of the project to reduce or eliminate the impact over time, and replace or provide substitute resources or environments to compensate for the impact. Compensation is the last option pursued, because the resource benefits the most if it remains intact and in place.

The New River and the Bluestone River and their associated aquatic, wetland, and riparian habitats have been classified as Resource Category 1 by the Service according to our mitigation policy. The tailwaters of the Bluestone Dam are also considered Resource Category 1 habitats. Resource Category 1 habitats are those habitats that are of high value for evaluation species and are unique and irreplaceable on a national basis or in the ecoregion section. No loss of existing habitat value is allowed for these habitats. Because these one-of-a-kind areas cannot be replaced, all losses of existing habitat values should be prevented. Insignificant changes that do not result in adverse impacts may be acceptable.

Definitions

The following terms are not defined in the Service's Mitigation Policy, so the West Virginia Field Office developed the following definitions to categorize types of impacts within the project area:

Long term habitat loss – when impacts result in habitat loss for evaluation species that lasts for more than 1 year.

Short term habitat loss – when impacts result in habitat loss for evaluation species that lasts for less than 1 year.

Temporary impacts – are impacts that are not expected to last or remain indefinitely.

Permanent impacts - are impacts that are expected to last or remain unchanged indefinitely.

Sequential Mitigation Procedures

In order to minimize impacts, the Corps has discarded all alternatives that propose permanent impacts to Resource Category 1 aquatic habitat. There are no feasible alternatives that avoid temporary impacts to these habitats. The Corps has also discarded alternatives that do not avoid or minimize these temporary impacts. The remaining alternatives minimize temporary impacts to Resource Category 1 habitats and limit permanent impacts to within the existing stilling basin footprint, which is previously altered habitat that has minimal natural resource value.

To minimize downstream impacts to fish, wildlife, and their habitats, the Corps will implement erosion and sedimentation best management practices (BMP's). BMP's include, but are not limited to, the following: installation of sediment and erosion control devices (e.g. silt fences, filter socks, temporary sediment control basins, erosion control matting); adequate and continued maintenance of sediment and erosion control devices to insure their effectiveness; siting equipment staging, fueling, and maintenance areas outside of wetlands, streams, and riparian areas; and preventing sediment debris, and pollutants from entering the New River as much as

possible. Tree cutting will be minimized by clearing in previously disturbed areas. Seasonal restrictions for tree clearing will be followed to prevent taking bird nests, eggs, and young (between September 1 and March 31, which is outside the nesting season for most native bird species). By incorporating these measures into the mitigation plan, the Corps should significantly avoid and minimize negative fish and wildlife resource impacts resulting from upland disturbance.

Fishing opportunities may be lost during construction because the existing fishing pier will be removed during construction, which is expected to last up to 8 years. Riparian habitat near the dam may be disturbed temporarily to create staging areas for equipment and materials. Aquatic habitat will also be temporarily disturbed due to construction in the stilling basin and use of cofferdams downstream. In order to address these impacts, the Corps has agreed to restore the affected fishing opportunities and riparian and aquatic environment to baseline conditions, or better, after construction has concluded by constructing a new fishing pier at a revised location, replanting the riparian habitat, and restoring disturbed fish habitat. Loss of fishing opportunities during construction will also be mitigated by maintaining access to the shoreline downstream of construction sites so anglers can continue fishing in the tailwaters. The Corps will coordinate with the Service and the West Virginia Division of Natural Resources (WVDNR) to determine where to relocate the existing fishing pier. The Corps should provide the Service with recommended designs and locations prior to development of the Final FWCAR.

The Corps plans to use maintenance operations (care and diversion of water) during construction to reduce the impact from altered flow regimes downstream of the project over time. The Corps does not anticipate that flow distribution downstream will be significantly impacted since some flow will be allowed into the stilling basin at all times. Current project plans state that flow will be maintained in half of the stilling basin and that 8 out of the 16 sluices gates will be operational at all times. The Service strongly recommends that if flow must be stopped, construction should be arranged so that the flow is disrupted for the minimum amount of time necessary; flows should be resumed after no longer than 24 hours.

The Corps has developed an Environmental Hydrologic Analysis tool to model various flow conditions at Bluestone Dam. The terrain data, used by the Corps to generate the models, was a compilation of aerial Light Detection and Ranging (LiDAR), terrestrial based LiDAR, and bathymetric survey sections. The analysis is meant as a relative comparison and does not predict absolute values. The Service focused on the models that predicted low flow conditions, to determine potential direct and indirect impacts from the care and diversion of water. After reviewing the models that predict minimum releases at 610, 1,500, and 2,500 cubic feet/sec (cfs), the Service determined that the care and diversion of water may temporarily impact Resource Category 1 aquatic habitat downstream of the cofferdams (reaching as far as the island near the right descending bank). The modeling predicts that once water reaches the weir it will not distribute flow evenly throughout the tailwater area during low flow conditions; certain sections could experience reduced flows, no flow, or will be dry. The model can also predict the probability of Bluestone Dam undergoing minimal flows and the duration of those flows (refer to Table 1. below). For example to answer the question what is the expected duration that flows will be less than 610 cfs in January over a 3 year construction period, multiply (3 years)(31 days in a month)(0.001 probability below 610 cfs) to obtain an estimate of 0.093 day. The Service

anticipates that if low flow conditions (610, 1,500, and 2,500 cfs) don't persist for more than 24 hours, then the probability that the downstream aquatic habitat will be significantly altered (during the Corps construction timeframe of 6-8 years) is low. However, there may be aquatic impacts due to the cofferdams causing low flow conditions downstream.

Table 1.

Duration Exceedance	Flow (cfs)											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0.1	55,871	36,855	50,910	52,975	35,898	44,573	31,886	36,046	40,032	32,500	45,216	36,259
0.2	52,771	36,075	48,890	51,539	34,146	42,944	29,872	30,820	38,909	31,526	43,054	31,768
0.5	46,086	33,619	46,362	45,555	31,680	33,970	25,030	23,661	34,499	24,877	36,404	28,786
1	39,889	31,574	42,958	38,874	29,108	28,771	19,141	16,815	31,101	20,199	28,555	23,869
2	32,733	27,526	37,669	33,872	25,624	22,127	11,759	10,971	21,317	14,543	21,428	20,032
5	21,531	21,197	28,642	24,447	17,137	13,873	6,869	6,493	7,981	9,273	11,926	14,651
10	14,600	16,038	19,685	16,729	12,661	9,689	5,065	4,630	4,945	6,089	8,432	10,796
15	11,338	12,343	15,673	12,915	10,094	7,831	4,380	3,845	3,704	4,489	6,899	8,466
20	9,485	10,584	13,184	10,773	8,692	6,621	3,972	3,390	3,168	3,686	5,832	6,925
30	7,155	8,630	9,950	8,898	7,299	5,330	3,499	2,869	2,448	2,798	4,566	5,244
40	5,966	7,047	8,376	7,608	6,386	4,308	3,131	2,538	2,146	2,231	3,560	4,027
50	4,912	5,476	7,276	6,608	5,673	3,785	2,837	2,177	1,968	1,908	2,778	3,399
60	3,944	4,402	6,207	5,758	5,034	3,342	2,526	1,981	1,759	1,626	2,187	2,940
70	3,143	3,674	5,034	4,958	4,434	2,893	2,298	1,754	1,529	1,481	1,874	2,364
80	2,434	3,023	4,137	4,131	3,793	2,272	2,027	1,444	1,408	1,360	1,599	1,858
85	2,137	2,671	3,507	3,676	3,264	2,116	1,856	1,350	1,309	1,246	1,549	1,679
90	1,893	2,297	2,975	3,278	2,788	1,801	1,658	1,154	1,193	1,183	1,481	1,561
95	1,535	1,927	2,295	2,746	2,427	1,627	1,430	1,017	1,060	1,054	1,326	1,451
98	1,336	1,682	1,998	2,246	1,851	1,357	924	902	910	833	1,222	1,302
99	1,169	1,579	1,756	2,045	1,788	1,216	767	847	845	803	1,202	1,166
99.5	754	1,481	1,626	1,614	1,521	1,071	748	836	836	797	1,086	1,109
99.8	659	1,402	1,336	1,187	1,347	1,053	742	764	823	610	944	847
99.9	610	1,341	1,173	610	1,324	900	727	745	800	610	810	610

The Corps has worked closely with the Service to design an alternative that limits the project's permanent impacts in the tailwater area to the existing stilling basin footprint. In order to modify the stilling basin, the Corps will need to install and operate a series of cofferdams to facilitate construction efforts. The use of these cofferdams during construction will cause a long-term loss of natural river bottom aquatic habitat for approximately 6-8 years. These areas will be restored to baseline conditions, or better, by returning flows regimes to baseline conditions and restoring any disturbed aquatic habitat (e.g. rocks, water willow, islands etc.). Because the Corps has avoided and minimized to the maximum extent practicable, the Service has prepared this mitigation plan to address the remaining short and long-term loss of habitat and the temporary impacts in the tailwaters of the dam.

Habitat Unit Calculations

The results of the HEP were used to calculate mitigation requirements for the proposed project. Mitigation requirements are calculated by overlaying the project impact map with the habitat map, and then calculating the acreage impacted for each habitat area. The acres impacted are then multiplied by the Habitat Suitability Index (HSI) scores (Table 2.) for that habitat area to determine Habitat Units (HU) required for mitigation. Table 3 shows the average HU value for each habitat type in the impact area (62.50 acres). The total study area for aquatic and terrestrial habitat was approximately 125 acres and 5.7 acres, respectively.

Table 2. Overall HSI Scores

Species	HSI Score
Smallmouth Bass	0.83
Common Shiner	0.80
Mink	0.52
Yellow Warbler	0.22
Black-Capped Chickadee	0.78

In determining HU values for mitigation, one HU is equal to one acre of habitat with a HSI rating of 1.0 (i.e., ideal habitat conditions for that species within that one acre of habitat). HU mitigation credit can be gained by creating, enhancing, or restoring existing habitat. Under this approach, credit is given for the improvement of resulting habitat over and above the existing or baseline habitat condition. For example, 10 acres of existing terrestrial habitat with a current HSI rating of 0.5 would provide five HUs. If that area is enhanced by creating snags or improving potential brood cover, then potentially 10 acres of habitat with a maximum HSI of 1.0 would be created, for a total of ten HUs. Thus, five HUs of mitigation credit would be obtained. It should be noted that, since perfect 1.0 HSI scores are difficult to obtain, under normal situations the amount of credit obtained would be less than provided for in this hypothetical example. Credit could also be obtained by preserving existing habitat. Because preservation does not result in an immediate increase in existing habitat values most agencies including the Service, WVDNR, and the Corps typically require more than a 1:1 ratio for this type of mitigation. The amount of credit obtained under this approach would need to be established by consensus of all agencies and would vary based on the quality of habitat preserved.

Table 3. Overall Habitat Units by site.

SPECIES	Aquatic	Terrestrial
Smallmouth Bass	51.88	
Common Shiner	50.00	
Mink		2.96
Yellow Warbler		1.25
Black-Capped Chickadee		4.45
Average HU Value	50.94	2.89

**Baseline Habitat Units in Impact Area (62.50 acres)

Mitigation credits for enhancement activities are most easily gained by addressing the limiting factors for each habitat area, as described in the aquatic evaluation species and model descriptions section below. Mitigation through creation or preservation should focus on reproducing the conditions that resulted in the highest scored variables. For example, mitigation plans to enhance existing aquatic habitats might focus on providing overhanging woody

vegetation, instream cover, and wide forested buffers. The Service recommends that the Corps mitigate for the potential indirect temporary aquatic impacts (short-term habitat loss) that could occur during low flow conditions (approximately 50.94 HUs), resulting from the presence of cofferdams. This is particularly important because Resource Category 1 aquatic habitat will be adversely affected.

In order to calculate the number of HU's necessary to mitigate for the temporary aquatic impacts, the Service reviewed the hydrology models provided by the Corps. Based on these models, the Service determined that approximately 62.5 acres (half of the 125 acre survey area) could be impacted by altered flow regimes during low flow conditions. Low flow conditions could have the following impacts on aquatic resources downstream of the dam:

- loss of aquatic species habitat – instream and riparian cover such as rock outcrops, boulders, and cobble/pebble riffles;
- loss of emergent water willow;
- decrease in benthic macroinvertebrates, mussels, and fish populations in the project area;
- and/or alter water quality, turbidity, and total organic carbon/biological oxygen demand.

In addition, altered flows regimes could decrease the HEP scores for the smallmouth bass and common shiner (potential impacts are highlighted in red). Evaluation species habitat descriptions and model descriptions are provided in the following section.

An estimate of terrestrial impacts has not yet been provided to the Service, but the Corps has agreed to replant disturbed areas, where possible, with native vegetation.

Aquatic Evaluation Species and Model Descriptions

Smallmouth bass commonly occur in large clear lakes and reservoirs with rocky shorelines, as well as in perennial streams with bottoms comprised of gravel beds, large boulders, rubble, or bedrock. These are the preferred substrates for smallmouth bass to build their nests for spawning, and provide shelter to juveniles and adults. Smallmouth bass are sight feeders and choose their prey based on relative abundance and availability. Smallmouth bass typically eat smaller fish, crayfish, insects, and amphibians. Smallmouth bass prefer a water temperature of about 21 °C. They also require at least 6 mg/L of dissolved oxygen and a pH range of 5.7-8.6 for optimal growth.

Model variables for the smallmouth bass include:

Cover/Reproduction/Feeding

- Clear (≤ 25 JTU¹) water – construction activities could cause increased turbidity
- Stream gradient between 0.75 and 4.7 meters/kilometer (m/km) – will remain the same during construction
- At least 25% pools – water may become stagnant during low flow conditions

¹ The Jackson turbidity unit (JTU) is roughly the same as a Nephelometric turbidity unit (NTU): a measure of turbidity in a water sample.

- At least 25% cover and/or > 1m depth in the pools – cofferdams (care and diversion of water) may result in dry areas (loss of cover), decreased depth in pools, reduced flows, and stagnant pools
- Warm summer water temperatures, 21 -29 degrees Celsius (degrees C) – shallow depth during low flows can lead to an increase in temperatures
- Gravel, rubble, or boulder substrate – certain sections of the river will not be accessible to fish during low flow conditions

Common shiners are found in small and medium-sized streams with clear, cool water, and a moderate current. These shiners prefer unvegetated gravel to rubble bottoms; they frequent pools in streams more often than rapids. They excavate depression nests in gravel or sand; most nests are built in riffles 13 to 44 mm deep. Common shiners are omnivorous, feeding on nearly equal amounts of plant and animal matter. The common shiner model was selected to represent the New River shiner (*Notropis scabriceps*), an endemic species in the New River that has similar habitat requirements as the common shiner.

Model variables for the common shiner include:

Water Quality

- Maximum summer water temperature persisting for longer than 1 week (below 25 degrees Celsius is optimal) – if low flow conditions persist for longer than 1 week temperatures could exceed 25 degrees C
- Minimum pH between 6.5 and 8.5 – pH should remain the same during construction, unless there is a chemical spill
- Average turbidity (clear < 30 JTU) - construction activities could cause increased turbidity

Food/Cover

- Percent pools – interspersed with riffle areas for spawning (1:1 pool-riffle ratio is optimum) – low flow conditions would increase pool habitat in the project area, but pools would be shallow and/or stagnant
- Predominant pool class- moderate size and depth, commonly found below falls or riffle-run areas; 5-30% of bottom obscured by depth or turbulence - low flow conditions would increase pool habitat in the project area, but pools would be shallow and/or stagnant

Service Mitigation Recommendations

The Corps estimates the long-term habitat loss of approximately 2.25 acres of Resource Category 1 aquatic habitat as a result of cofferdam construction. Based on the hydrology modeling provided by the Corps, the Service also anticipates that approximately 62.50 acres of indirect temporary and short term impacts may occur downstream of the cofferdams, due to altered flows regimes.

The Service does not typically support projects that propose impacts to Resource Category 1 habitat. These areas are rare, irreplaceable, and are highly suitable and important to the conservation of evaluation species. The Service's policy for Category 1 resources is to recommend avoidance of all impacts, but because alternatives are not available to avoid these impacts the Service will seek a net gain in conservation as an outcome on this project. It is

consistent with the Service's mission to identify and promote opportunities for a net gain towards achieving conservation objectives during mitigation planning. A net gain that decreases the gap between the current and desired status of a resource is resource enhancement. As stated in the introductory paragraph pursuant to the FWCA, the Corps should be enhancing fish and wildlife habitat in addition to mitigating for the loss of that habitat.

In order to achieve this objective, the Service recommends off-site mitigation in combination with all of the aforementioned avoidance and minimization practices. The Service worked with the Corps to develop the following off-site mitigation site selection criteria (the selected site should meet at least 3 of the 5 criteria listed below):

1. The site should be adjacent to the New River (river front property). The site can either have intact riparian buffers, and receive mitigation credit for preservation, or lack riparian buffers and receive credit for restoration.
2. The site should contain direct tributaries to the New River that are in need of restoration or enhancement. Restoration work can include, but is not limited to, livestock fencing, stream restoration work, enhancement of riparian buffer to reduce erosion (tree/shrub planting), and/or removal of barriers to fish passage.
3. The site should be significantly forested or have the potential to be replanted to improve riparian buffers.
4. There is the ability to secure the mineral and development rights for the site to ensure that it will not be developed in the future.
5. The site should be adjacent to another conservation area (e.g. Wildlife Management Area, State Park, or federally protected land).

Additional attributes that are not listed as criteria, but would increase the value of a site are: recreational uses/benefits, benefits to threatened and/or endangered species, unique habitats (such as an island on the New River), and/or a land-owner that is willing to sell. [REDACTED]

Conclusion

In an effort to obtain a net gain in conservation for this Resource Category 1 habitat, the Service recommends that the Corps use the mitigation site selection criteria listed above to select a site that adequately mitigates for the 50.94 aquatic HU's that will be temporarily impacted during construction, which could result in short-term habitat loss. The Service will work with the Corps and the WVDNR to select an appropriate mitigation site. The Corps should have acceptable and available mitigation sites identified prior to the completion of a Final FWCAR.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
502 EIGHTH STREET
HUNTINGTON, WEST VIRGINIA 25701-2070

May 23, 2016

Planning Programs and Project Management Division
Planning Branch, Environmental Analysis Section

Ms. Tiernan Lennon
U.S. Fish and Wildlife Service
West Virginia Ecological Services Field Office
694 Beverly Pike
Elkins, WV 26241

Dear Ms. Lennon:

The U.S. Army Corps of Engineers, Huntington District (District) is continuing coordination efforts under the Fish and Wildlife Coordination Act and Section 7 of the Endangered Species Act with regards to the Bluestone Dam Safety Modification Study (DSMS) project. As you are aware, the District is in the process of preparing a Draft Supplemental Environmental Impact Statement (DSEIS). As follow-up to our May 17, 2016 conference call, our office is providing your agency with this letter regarding our conceptual plans for recreational mitigation.

As discussed with you during previous team meetings, the Bluestone DSMS tentatively selected plan involves modifications to the existing stilling basin which would change the flow from the dam during construction by cutting the downstream stilling basin in two halves with a cofferdam, allowing only half of the 16 sluice gates to work at a time while the other half is under construction. Each half of the stilling basin could be closed off for 3-5 years at a time with a projected total construction period of 6-8 years. During high flow events only half of the total flow capacity would be available for release without removing the downstream cofferdam. This reduction in gate use may cause higher pools in the reservoir which would hold the lake for a longer amount of time than what the pool currently experiences.

As part of this study the District is evaluating the potential recreational impacts and identifying possible recreational mitigation measures. Due to known impacts to the downstream recreation area with loss of the Americans with Disabilities Act (ADA) accessible fishing pier due to future construction activities, the District is identifying both temporary and permanent conceptual mitigation for these impacts. Temporary mitigation measures are intended to be in place before any construction begins in order to prevent a gap in recreational access. With the

help of a District contractor, we are developing mitigation plans that will be analyzed by both the District and agency stakeholders to identify the most appropriate mitigation measures to compensate for these impacts. Some conceptual mitigation measures to date include adding an additional boat access areas to accommodate various lake elevations, placing additional ADA fishing pier/water access both up and down stream of the dam, and designing a permanent fishing pier access in the same area as the current fishing pier once construction has completed.

Please provide us with any concerns or questions your agency has concerning the conceptual mitigation measures and feel free to contact Ms. Megan Wilburn at (304) 399-5797 or by email at Megan.B.Wilburn@usace.army.mil.

Sincerely,

A handwritten signature in black ink that reads "Rebecca Rutherford". The signature is written in a cursive style with a large initial "R".

Rebecca A. Rutherford
Chief, Environmental Analysis Section



United States Department of the Interior



FISH AND WILDLIFE SERVICE

West Virginia Field Office
694 Beverly Pike
Elkins, West Virginia 26241

June 30, 2016

Ms. Amy K. Frantz
Chief, Planning Branch
U.S. Army Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701

Dear Ms. Frantz:

This constitutes the U.S. Fish and Wildlife Service's (Service) Draft Fish and Wildlife Coordination Act Report for the Bluestone Dam Safety Project in Summers County, West Virginia. This Draft Fish and Wildlife Coordination Act Report is being provided under the terms of the August 2015 Scope of Services Agreement between the U.S. Army Corps of Engineers Huntington District and the Service's West Virginia Field Office.

If you have any questions regarding this Draft Fish and Wildlife Coordination Act Report, please contact Tiernan Lennon of my staff at (304) 636-6586, Ext. 12, or Tiernan_Lennon@fws.gov.

Sincerely,

John E. Schmidt
Field Supervisor

Ms. Amy K. Frantz
June 30, 2016

2

cc:

USACE – Rebecca Rutherford

USACE – Megan Wilburn

WVNDR - Danny Bennett

ES:WVFO:TLennon:skd:6/30/2016

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and Wildlife Coordination Act Report Transmittal Letter.docx

DRAFT

FISH AND WILDLIFE COORDINATION ACT REPORT
BLUESTONE DAM SAFETY PROJECT
SUMMERS COUNTY, WEST VIRGINIA

June 2016

Prepared for

U.S. Army Corps of Engineers
Huntington District
Huntington, West Virginia 25701

Prepared by

U.S. Fish and Wildlife Service
West Virginia Field Office
Elkins, West Virginia 26241

Overview

This constitutes the Draft Fish and Wildlife Coordination Act Report (FWCAR) for the U.S. Army Corps of Engineers, Huntington District (Corps), Bluestone Dam Safety Project in Summers County, West Virginia. This project proposes to modify the existing dam to current design criteria by taking into account probability of dam failure, including all potential structural failure modes, and downstream scour in the event of a Probable Maximum Flood (PMF). The purpose of this Draft FWCAR is to address fish and wildlife resource impacts associated with implementing the proposed project and provide mitigation recommendations for impacts to those resources.

The Draft FWCAR also provides a preliminary analysis of the effects of the proposed dam modification measures and project alternatives on high quality, rare, and irreplaceable fish and wildlife resources (Resource Category 1 habitat). The No Action alternative is being presented for comparative purposes, but it does not meet the Corps Tolerable Risk Guidelines (Corps 2014). In addition to the No Action alternative, the effects of the Tentatively Selected Plan are being evaluated. The Tentatively Selected Plan limits permanent impacts to within the existing stilling basin footprint, which is previously altered habitat that has minimal natural resource value. Other alternatives were considered and dismissed as described in the 2016 Draft Environmental Impact Statement (EIS), and will not be further discussed in this FWCAR.

Prior Studies

The U.S. Fish and Wildlife Service (Service) previously prepared a Planning Aid Letter (PAL) and a Habitat Evaluation Procedures (HEP) Report for this site to address fish and wildlife resources. The Service provided the PAL for the Bluestone Dam Safety Project on March 28, 2014, based on preliminary project information provided by the Huntington District. The PAL provided information on the fish and wildlife resources within the project site and reconnaissance areas, as well as a preliminary assessment of potential biological impacts from the proposed modification of the dam and associated habitats (Appendix B). While preparing the PAL, the Service also conducted a preliminary HEP assessment of existing riverine and riparian resources in the area immediately downstream of the dam (Appendix A). The October 28, 2013 preliminary draft HEP Report was intended to characterize current environmental conditions in the tailwater area immediately below the dam. The information in the HEP Report establishes the baseline environmental conditions for the project area and was used to formulate alternative risk management plans. The Corps provided us a summary of their Tentatively Selected Plan on March 15, 2016, and out of the seven previously proposed alternatives they selected the least environmentally damaging one. The Service prepared a preliminary mitigation plan on April 19, 2016 (Appendix C), to provide guidance to the Corps early in the planning process so that they could develop more detailed mitigation plans and incorporate them into the Draft EIS. For a complete summary of prior studies refer to the PAL (Appendix B).

Description of the Study Area

Bluestone Dam is located on the New River at the community of Bellepoint, in Summers County, West Virginia, approximately 2.5 miles downstream of the confluence of the New and Bluestone Rivers, and 0.8 miles upstream of the confluence of the New and Greenbrier Rivers (Figure 1). The study area includes the water and adjacent lands of the Bluestone Project (the dam, Bluestone Lake flood control reservoir, and adjacent Federal, State, and private lands), as

well as portions of the New River and its tributaries (the Bluestone and Greenbrier Rivers), and the Kanawha River and its tributaries (the Gauley and Elk Rivers). This large study area encompasses a 4,565-square-mile drainage area extending along the New River from Bluff City, Virginia, to the junction of the Kanawha River with the Ohio River at Point Pleasant, West Virginia (Figure 1). Whereas only a small portion of the study area will be directly affected by project construction, the study area is large enough to encompass the area of potential direct, indirect, and cumulative effects of a Probable Maximum Flood (PMF) event.

For planning purposes, the study area is subdivided into four reconnaissance areas: 1) Bluff City to Sandstone; 2) Sandstone to Gauley Bridge; 3) Gauley Bridge to Poca; and 4) Poca to Point Pleasant (Figure 1). For a more detailed description of each reconnaissance area refer to Appendix B.

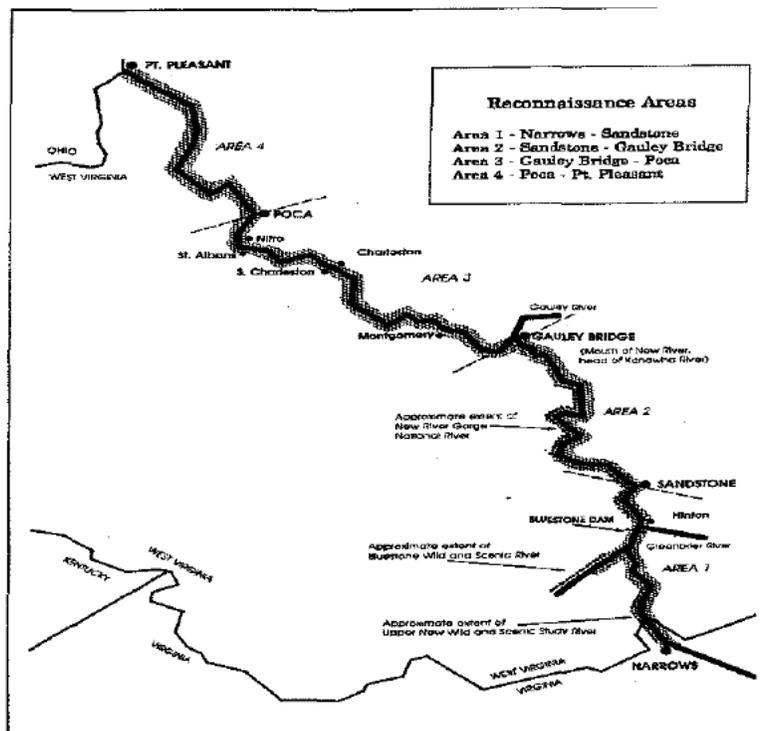


Figure 1. Map of the entire Bluestone Dam Project study area.

The Service anticipates that adverse impacts from the Tentatively Selected Plan would only occur in Reconnaissance Area 1, more specifically the reach immediately above and below Bluestone Dam. Therefore, the rest of this document will only focus on resources in Reconnaissance Area 1 that may be affected as a result of project construction and operation.

The New River and the Bluestone River, and their associated aquatic, wetland, and riparian habitats, have been classified as Resource Category 1 by the Service according to our Mitigation Policy (Federal Register, Vol. 46, No. 15, 7644-7663, January 23, 1981). The tailwaters of the Bluestone Dam are also considered Resource Category 1 habitats. Resource Category 1 habitats are those habitats that are of high value for evaluation species and are unique and irreplaceable on a national basis or in the ecoregion section. No loss of existing habitat value is allowed for

these habitats. Because these one-of-a-kind areas cannot be replaced, all losses of existing habitat values should be prevented. Insignificant changes that do not result in adverse impacts may be acceptable.

Aquatic habitats within the vicinity of Bluestone Dam are of high quality and considered by the Service to be unique and irreplaceable on a national basis. The free-flowing reaches of the New and Bluestone Rivers above the dam, as well as the tailwaters below the dam, contain a great diversity of excellent quality fish and wildlife habitats. A brief summary of downstream tailwater habitats is provided below.

The habitats in the tailwaters of Bluestone Dam include numerous islands, riverine emergent and aquatic bed wetlands, runs, riffles, and pools. The New River downstream of the dam (66 miles to its confluence with the Gauley) supports one of the best warm water fisheries in West Virginia. It features smallmouth bass, spotted bass, rock bass, flathead catfish, and channel catfish. In regard to smallmouth bass, this reach of New River supports one of the best fisheries for this species in the United States (Service 1998).

The tailwaters have numerous islands and riverine wetlands when compared to the downstream reaches in the New River Gorge National River. The riverine emergent wetlands are dominated by water willow, and are associated with shallow water areas around islands, shorelines, and riffles. The combination of runs, riffles, and pools in this reach of river is near optimum for smallmouth bass habitat (Appendix A). Refer to the PAL (Appendix B), for more information on the quality and value of fish, wildlife, and plant resources in the study area.

Since the PAL was written, the northern long-eared bat (*Myotis septentrionalis*)(NLEB) was listed under the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) as threatened on April 2, 2015. On January 14, 2016, the Service finalized a 4(d) rule to provide measures that are necessary and advisable to provide for the conservation of the NLEB. The final 4(d) rule went into effect on February 16, 2016.

The NLEB occurs within the range of this proposed project and its study area. This project does not currently propose to clear any trees ≥ 3 inches diameter at breast height (dbh) and it is not located within any known hibernacula or roost trees buffers, therefore the Service does not anticipate that this project will adversely affect the NLEB. The Corps should continue to coordinate with the Service on federally listed species as project plans are finalized.

Project Description

At this stage of project planning, the Corps has discarded a large number of structural and non-structural design measures that would allow Bluestone Dam to operate under increased flood conditions. Initially, Corps staff identified approximately 85 measures (Corps 2013). Since then the Corps has eliminated many measures as structurally and/or economically unfeasible, or by making certain measures design elements that will be incorporated into plans for other alternatives. Measures and/or alternatives that have been discarded will not be discussed further in this draft FWCAR. The alternatives being considered are summarized below.

Hydraulic Jump Basin with Supercavitating Baffles Alternative

This alternative has been identified as the Tentatively Selected Plan and combines various structural and non-structural design measures to ensure stability of the stilling basin and the dam during extreme flood events (Figure 2). Non-structural risk management measures are additives that further reduce risk. The following structural measures are included in this alternative.

To reduce risk associated with overtopping, the Corps is considering the installation of the remaining portions of the 8 feet high parapet wall across the non-overflow sections of the dam. The new section of parapet wall would tie into the already constructed sections and the highway gate closure. This parapet wall was an authorized component of the 1998 Dam Safety Assurance Study recommendation.

To reduce risk associated with insufficient spillway capacity, the Corps proposes to modify the existing stilling basin, which consists of a two stage system. The modified stilling basin will remain a two stage system within the same footprint, but will include various modifications and features. The existing stilling basin (comprised of natural riverbed) will be excavated and replaced with a protective concrete overlay. The first stage baffle blocks will be demolished and replaced with new larger blocks. In order to stabilize against uplift pressures, both the existing and new concrete slabs (apron) will be anchored and a new drainage gallery (within the dam or first stage) will be constructed. The second stage basin, which consists of the second stage apron, training walls, and baffle blocks, will be reconstructed and anchored into the riverbed to ensure stability and satisfactory performance. The height and base width of the existing training walls will be increased to contain the hydraulic jump and high velocity flows within the basin (Figure 2).

The stilling basin is anticipated to be constructed in two phases. In order to modify the stilling basin, temporary construction barriers (coffer cells) will be put in place to minimize impacts to downstream habitat. A permanent divider wall will be constructed to segregate the basin in two halves so that 8 of the 16 dam sluice gates will be operational at all times during construction.

Non-structural risk management measures include: an enhanced risk communication plan (to regularly educate the downstream public of the flood risk and emergency procedures) and installing equipment that remotely operates the 21 vertical crest lift gates (in order to reduce the risk to project personnel in the event of inflows predicted to exceed top of dam).

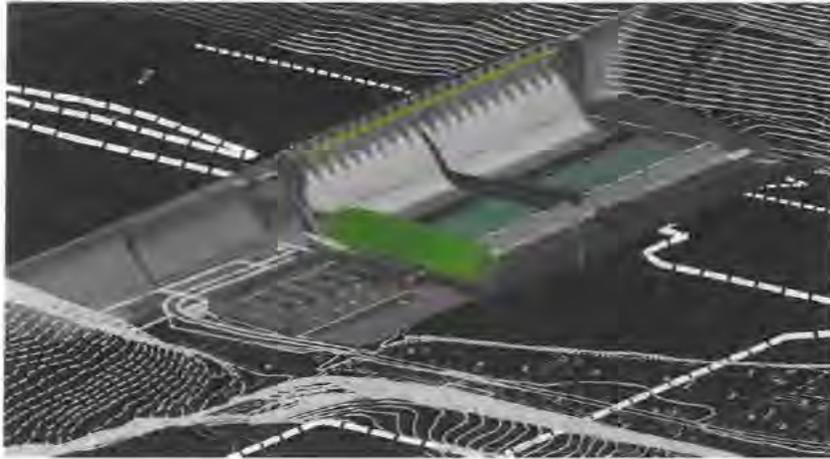


Figure 2. 3D Diagram of the Hydraulic Jump Basin with Supercavitating Baffles Alternative.

No Action Alternative

Under this alternative, the dam would be allowed to overtop. However, it is estimated that at a pool elevation of 1532' mean sea level (MSL), the dam would fail resulting in significant property damage and potential loss of life. This alternative does not fulfill the purpose of the project.

Potential Project Effects

Current dam operations use flood control capabilities of the dam up to 1520.0' MSL and then pass all the water the dam is able to above that level. Under the proposed action, project operations would only change if a large flood event occurred during construction. In that case the dam would retain more water in the reservoir for a longer period of time. Therefore, no long-term changes in dam operations would occur that would result in adverse effects to fish and wildlife resources, and most effects of the project would occur as a result of and during project construction.

Construction impacts are likely to occur and need to be avoided or minimized to the greatest extent possible because of the excellent habitat downstream of the dam. These are discussed in greater detail below. Impacts due to the PMF were discussed in greater detail in the PAL (Appendix B).

Hydraulic Jump Basin with Supercavitating Baffles Alternative (Tentatively Selected Plan)

The Corps has worked closely with the Service to design this alternative so that it limits the project's permanent impacts in the tailwater area to the existing stilling basin footprint. The Tentatively Selected Plan is likely to involve the pairing of multiple design measures as described in the project description section above. Potential adverse impacts from the proposed measures include loss/fragmentation of riparian habitat, changes to the river bottom, altered flows, increased sedimentation, scour of the river bottom and banks, and changes in water depth and velocity. The Service anticipates that direct and indirect adverse impacts from the Tentatively Selected Plan would occur only in Reconnaissance Area 1, more specifically from the tailwaters of Bluestone Dam downstream to the Route 3 Bridge, and along the riparian zone in this stretch of the river. Direct impacts from the Tentatively Selected Plan include long-term

loss of habitat a specific distance downstream of the existing footprint, temporary impacts to recreation due to construction schedule and duration, and temporary erosion of the riparian island located river right in the tailwaters. Indirect impacts from this alternative include degradation of habitat downstream due to the care and diversion of water (e.g. the use of coffer cells) and the modification of hydraulic regimes. Direct and indirect adverse impacts could result in loss of velocity shelters for fish and loss of optimal breeding habitat downstream.

In the event of a large flood during construction, the retention of a higher pool in the reservoir may inundate recreational areas upstream of the dam for a longer period of time. Recreational areas that could be affected include the swimming/boating area referred to as “The Pit” and the National Park Service’s (NPS) camp grounds. Additionally, the drift and debris tower (a multi-level intake tower used for passing drift and debris through the dam) will be out of service for the entire length of construction which means that more debris will be passed through the sluice gates. This could cause larger amounts of debris to settle out on NPS and State lands, which may further impede recreational activities during construction and potentially degrade aquatic habitats downstream.

Construction activities that have the potential to disturb terrestrial and aquatic resources in the project area are further described below.

1. Coffer Cells

In order to modify the stilling basin, the Corps will need to install and operate a series of coffer cells (36ft x 36ft) to remove water from the instream construction area and facilitate construction efforts. The use of these coffer cells during construction will cause a long-term temporary loss of two acres of natural river bottom aquatic habitat for approximately 8 to 10 years. Based on the hydrology modeling provided by the Corps on February 29, 2016, the Service also anticipates that approximately 62.50 acres of indirect temporary and short term impacts may occur downstream of the coffer cells, due to altered flows regimes. Natural low flow conditions, exacerbated by the presence of coffer cells and diversion of water during construction, could have the following impacts on aquatic resources downstream of the dam: loss of aquatic species habitat – instream and riparian cover including as rock outcrops, boulders, and cobble/pebble riffles; loss of emergent water willow; erosion of the riparian island; loss of velocity shelters and optimal breeding habitat for fish; decrease in benthic macroinvertebrates, mussels, and fish populations in the project area; and/or alter water quality, turbidity, and total organic carbon/biological oxygen demand.

2. Anchor Placement

Concrete fines which could potentially escape into the river will be created during drilling and cutting of existing concrete to place anchors. Ingestion of these fines could be harmful to aquatic organisms. Therefore steps should be taken to reduce the amount of slurry created. The anchor holes should be drilled using a dry cutting process so that no slurry will be created during this phase; and the concrete fines should be disposed of at an approved facility.

3. Staging Areas

Staging areas are proposed to be located on previously developed and disturbed Corps property. The existing recreation access area on the left descending bank of the dam will be used as a construction staging area and will be closed to public access during project construction. The existing fishing pier in this area will be removed during construction. A portion of the recreation area on the right descending bank below the dam will be used as another staging area and for placement of a concrete batch plant. This area provides important angler access to the tailwaters, particularly the stilling basin. Angler access along the shoreline will be restricted to areas downstream of the coffer cells (distances have yet to be determined), on both sides of the river for approximately 8-10 years.

4. Other

The amount of natural rock that will be excavated from the stilling basin has not been estimated at this time and spoil area(s) have not been identified. Therefore, there is currently insufficient information for the Service to quantify or assess the effects associated with placement of spoil areas. All potential spoil sites should be reviewed and approved by the Service prior to the finalization of mitigation plans, so that impacts to federally listed species and fish and wildlife resources can be addressed appropriately.

No Action Alternative

This action could result in dam failure when the pool elevation reaches 1532.0' MSL. This would result in decreased upstream inundation times; increased downstream water velocities causing scouring; additional debris; and release of sediment that built up behind the dam over the course of its existence (about 67 years).

The increased water velocity and rushing water from the dam failure would increase the scouring of the river bottom and banks and the amount of sediment washed downstream. Sediment deposition would occur when the water begins to slow down; this would likely occur where the Kanawha River is formed by the Gauley and the New River. Additional deposition would occur in the navigation pools of the Kanawha River. Depending on the amount of sediment left behind the failed dam, chronic sedimentation may continue to occur with each high water event after the PMF until the dam is replaced.

Increased flood heights along the Kanawha River may cause release of hazardous materials into the system. Numerous chemical plants and industries using hazardous materials are found along the Kanawha. In addition, rail cars carrying hazardous materials are likely to be inundated. Materials carried in tanks could be washed downstream into the Ohio River. Intact tanks should not pose a significant danger, but those that rupture would impact fish and wildlife resources. Raw sewage entering the river could be of great concern if sewer lines rupture or if waste water treatment plants become inundated.

With the No Action alternative no construction impacts will occur.

Potential Effects of Climate Change

As part of the Bluestone Lake Dam Safety Modification Study, the Corps evaluated the effects of climate change on water resources in the Kanawha and New River Watershed for their future without action condition (FWAC). Using recent U.S. climate change and hydrology literature and modeling, the Corps has predicted that within the next 80 years we will see increases in mean annual air temperature (ranging from 0.5°F to 1.0°F per decade), increases in precipitation/runoff and stream flow (ranging from 5% to 25% higher in spring and between 5% to 35% higher in fall), and more intense rainfall events (in the 1 in 20 year event range) (Corps 2016).

Potential impacts associated with increased mean annual air temperature include shifts in aquatic and terrestrial species composition, more frequent algae blooms, and introduction of insect pests and diseases. Increased air temperature could result in warmer surface waters. This may cause cold-water species to migrate upstream to colder headwater areas, leaving warm-water species to dominate Bluestone Lake. Warmer water temperatures may also provide opportunities for the introduction of invasive aquatic species, which could lead to increased competition with native species. The combination of warmer water temperatures and increased nutrient input may lead to more frequent algae blooms, which can degrade water quality and shade out aquatic plant species. The lengthened growing season, caused by increased mean annual air temperature, may result in increased vegetation growth and shift in species composition from native species to invasive species. Those factors may also result in the introduction of insect pests and diseases that could be detrimental to the aquatic and terrestrial communities (Corps 2016).

Potential impacts associated with increased precipitation/runoff and stream flow include more frequent flood events, increased probability of dam failure and/or size of the PMF, decreases in recreation, erosion issues, and impacts to water quality. Increased precipitation and resultant runoff can introduce more pollutants into the water degrading water quality and increasing erosion downstream. The islands within the vicinity of the dam provide habitat to various terrestrial and aquatic species and may be significantly impacted or eliminated by erosion. More frequent flood events could preclude recreation if recreational areas remain inundated for longer periods of time (Corps 2016). Additionally, increased flow velocities for longer periods of time may discourage fisherman from wading across the river.

Accelerating climate change is resulting in impacts that pose a significant challenge to conserving species, habitat, and ecosystem functions. Climatic changes can have direct and indirect effects on species abundance and distribution, and may exacerbate the effects of other stressors (USFWS Revised Mitigation Policy, Federal Register, Vol. 81, No. 45, 12380-12403, March 8, 2016). The Appalachian Landscape Conservation Cooperative (LLC) compiled the results of 700 species climate change vulnerability assessments, in the Appalachians, and assigned them climate change vulnerability scores (Appalachian LLC 2016). Based on that compilation of data, the Service was able to select a few examples of species within the Bluestone study area that the Appalachian LLC considered vulnerable to climate change effects. The following species received vulnerability scores ranging from moderately to extremely vulnerable to climate change effects: the Bluestone sculpin (*Cottus sp.*), eastern hellbender (*Cryptobranchus alleganiensis*), Virginia spiraea (*Spiraea virginiana*), green salamander (*Aneides aeneus*), candy darter (*Etheostoma osburni*), and Alleghany woodrat (*Neotoma*

magister). These species were all previously mentioned in our PAL (Appendix B) as species in need of conservation. If the Appalachian LCC's climate change vulnerability scores are accurate, there is the possibility that within the next 80 years more species will warrant listing under the ESA within the Kanawha and New River watersheds.

In summary, the fish and wildlife resources in the Kanawha and New River watersheds will experience some level of impact due to climate change within the foreseeable future.

Mitigation Recommendations

The Service does not typically support projects that propose impacts to Resource Category 1 habitat. These areas are rare, irreplaceable, and are highly suitable and important to the conservation of evaluation species. The Service's policy for Category 1 resources is to recommend avoidance of all impacts. But because alternatives are not available to avoid these impacts, and because the Corps has selected the least damaging practical alternative, the Service will seek a net gain in conservation as an outcome on this project. This conservation gain should be focused on protecting or enhancing habitats of similar or equal value. It is consistent with the Service's mission to identify and promote opportunities for a net gain towards achieving conservation objectives during mitigation planning. A net gain that decreases the gap between the current and desired status of a resource is resource enhancement (USFWS Revised Mitigation Policy). Pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661–667e) (FWCA), the Corps should be enhancing fish and wildlife habitat in addition to mitigating for the loss of that habitat.

Avoidance, Minimization, and Conservation Recommendations

The Service is providing the following avoidance, minimization, and conservation recommendations (for the Tentatively Selected Plan) so that the Corps can incorporate measures that further minimize impacts and enhance fish and wildlife habitat into the Draft EIS, and into final design plans:

1. Coffey Cells

In order to minimize the potential direct and indirect impacts from the coffer cells, the Service recommends the following:

- The Corps should modify their water management plan to avoid significantly altering flow downstream and reduce stream bed scour during construction.
- Replant disturbed riparian areas with native, woody vegetation to create cover for wildlife, reduce erosion (stabilize the river bank), improve water quality, and reduce water temperatures.
- Plant water willow to reduce erosion and enhance breeding habitat for fish.
- Armor the banks of riparian islands to reduce erosion and loss of aquatic breeding habitat.
- Improve existing breeding habitat and velocity shelters for aquatic organisms by adding cover – riparian, rock boulder, and water willow.

All measures pertaining to creating or enhancing fish habitat should be coordinated with the West Virginia Division of Natural Resources (WVDNR) fisheries biologist.

2. Anchor Placement

The Service recommends that steps be taken to reduce the amount of slurry created from drilling and cutting the existing concrete. The anchor holes should be drilled using a dry cutting process so that no slurry will be created during this phase; and the concrete fines should be disposed of at an approved facility.

3. Staging Areas

Staging areas should be returned to pre-construction conditions so that they can be utilized for recreation. Recreational mitigation recommendations for the staging areas are discussed in the next section.

4. Other

All potential spoil sites should be reviewed and approved by the Service prior to final project designs or before the Corps develops a Final EIS, so that impacts to federally listed species and fish and wildlife resources can be addressed appropriately.

Additionally, no spoil should be placed in wetlands, aquatic sites, or any high quality riparian or terrestrials habitats, unless the placement is designed to enhance or restore these areas.

In addition to addressing construction impacts, the Corps should incorporate conservation measures to increase the abundance or resiliency of sensitive habitats so that the effects of climate change impacts won't be as severe within the project area.

Conservation Measures for Climate Change Impacts:

- Plant water willow to enhance fish breeding habitat;
- create more riparian islands or protect existing islands from erosion;
- create velocity shelters for fish;
- and develop a plan to address removal of terrestrial and aquatic invasive species. Invasive species management can help increase survival rates for native species.

Potential Mitigation Sites

The Service provided the Corps with preliminary mitigation recommendations in our April 19, 2016 Draft Mitigation Plan (Appendix C). Our recommendations have not changed significantly since we have not had the opportunity to access and evaluate potential mitigation sites to determine if our recommended mitigation is achievable and/or adequate to offset impacts to Resource Category 1 habitat. Therefore, at this time, the Service cannot determine whether there are sufficient, achievable opportunities available to adequately mitigate for the anticipated adverse effects to fish and wildlife resources from this proposed project.

Based on discussions with the Corps following the submission of our Draft Mitigation Plan, the Service has the following additional mitigation site selection recommendations/comments that were not previously mentioned in our Draft Mitigation Plan:

- Multiple sites can be selected to reach the mitigation goal, as long as the HU's generated by each site add up to the amount needed to achieve the goal (50.94 aquatic HU's)(Appendix C).
- Mitigation sites should have an interested long-term steward that has experience with successfully managing properties for fish and wildlife conservation purposes. We do not expect the Corps to manage the site(s) in perpetuity.
- The selected site(s) should be able to achieve the mitigation goal within the lifetime of project construction (8 to 10 years). For example if the objective is to increase evaluation species scores on the New River by reducing sedimentation, increasing cover for aquatic species, and improving water quality, selecting a mitigation site that is 0% forested may not achieve that mitigation goal. The rationale being that it could take over 10 years for that riparian buffer to generate the ecological lift needed to raise evaluation species scores.

After multiple discussions with the WVDNR, the Service has decided that the use of mitigation banks and in-lieu fee programs, to offset impacts in Resource Category 1 habitat, is unacceptable. Mitigation must directly benefit the Resource Category 1 habitat being impacted. Mitigation banks and in-lieu fee programs do not provide that opportunity.

Recreational Mitigation

On May 23, 2016, the Corps sent us a letter proposing some conceptual mitigation measures that included adding an additional boat access area to accommodate various lake elevations, creating an additional fishing pier/providing water access both up and down stream of the dam, and designing a permanent fishing pier in the same area as the current fishing pier once construction has been completed. All temporary mitigation measures must be in place prior to the removal of the existing structures, in order to prevent a delay in recreational access. The Corps should provide the Service and the WVDNR with designs and locations for recreational mitigation prior to development of the Final FWCAR.

Placement of natural rock into the reservoir from excavation of the stilling basin may serve to provide habitat for fish and reduce and/or eliminate the need for off-site spoil areas. In addition to creating fish habitat, the excavated rock slab could be used to armor eroding islands within the vicinity of the project. The Corps is currently working with the WVDNR to designate potential locations upstream of the dam for these mitigation activities.

Additional Studies

Due to an accelerated timeline, the Service was not able to access and evaluate potential mitigation sites/reference sites to determine if our recommended mitigation is achievable. Prior to the Final FWCAR, the following studies/additional information should be completed and/or provided so that Service can develop final mitigation plans:

- HEP evaluations should be performed on all potential mitigation sites that meet the site selection criteria described in Appendix C.
- The Corps should demonstrate that they have appropriated an adequate amount of money to offset impacts to Resource Category 1 habitat/achieve the amount of HU's necessary.

- The Corps should quantify terrestrial impacts so that the Service can calculate HU's and provide mitigation recommendations/complete section 7 consultation.
- The Corps should provide the Service with designs and locations for recreational mitigation.
- The Corps should provide a list of all potential spoil sites so the Service can assess impacts to fish and wildlife resources.

The Corps needs to provide this information to the Service within a suitable timeframe so that the Service can evaluate it and provide recommendations prior to the development of the Final EIS.

LITERATURE CITED

Appalachian Landscape Conservation Cooperative. 2016. http://applcc.org/research/applcc-funded-projects/final-narrative-climate-change-vulnerability-assessment/phase-ii-vulnerability-assessment-results/copy_of_data-access

U.S. Army Corps of Engineers. 2013. Bluestone Dam Risk Reduction and Management Measures Identification Meeting report. Huntington District, WV. 45 pp.

U.S. Army Corps of Engineers. 2014. Engineering and Design Safety of Dams – Policy and Procedures (ER 1110-2-1156). Chapter 5. Tolerable Risk Guidelines. Washington, DC. 528 pp.

U.S. Army Corps of Engineers. 2016. Bluestone Lake Dam Safety Assurance Program Draft Environmental Impact Statement, Huntington District, WV.

U.S. Fish and Wildlife Service. 1998. Planning Aid Report Fish and Wildlife Resource Impacts Bluestone Dam Safety Assurance Program Summers County, West Virginia. 22 pp.

APPENDIX A
PRELIMINARY HABITAT EVALUATION PROCEDURES REPORT
BLUESTONE DAM SAFETY PROJECT
OCTOBER 2013

APPENDIX B
FINAL PLANNING AID LETTER
BLUESTONE DAM SAFETY PROJECT
MARCH 2014

APPENDIX C
DRAFT MITIGATION PLAN
BLUESTONE DAM SAFETY PROJECT
APRIL 2016

Appendix I

404(b) EVALUATION

**SECTION 404(b)(1) EVALUATION
SUPPLEMENTAL ENVIRONMENTAL IMPACT
STATEMENT BLUESTONE DAM SAFETY
MODIFICATION PROJECT
HINTON, WEST VIRGINIA**

I. INTRODUCTION

As required by Section 404(b)(1) of the Clean Water Act, this evaluation assesses the short- and long-term impacts associated with the discharge of dredged and fill materials into waters of the United States resulting from this project. This evaluation summarizes the detailed impact discussion provided in the Bluestone Dam Safety Modification Project Supplemental Draft Environmental Impact Statement (SDEIS).

II. PROJECT DESCRIPTION

A. LOCATION. The Bluestone Dam is located on the New River in West Virginia, just upstream of the town of Hinton and community of Bellepoint. The site is developed for the existing project, and is currently undergoing construction associated with modifications authorized under the 1998 Dam Safety Assurance Study Final Environmental Impact Statement. See SDEIS Figure 2-3.

B. GENERAL DESCRIPTION OF PROJECT PLAN. The project plan proposes to address a potential dam failure mode identified during risk analysis by modifying the existing stilling basin to prevent scour that could result in spillway monolith instability, and thus dam failure, during extreme flood events.

The Tentatively Selected Plan (TSP) involves various features and risk management measures formulated to ensure stability of the stilling basin and the dam during extreme flood events, some of which would be constructed within jurisdictional waters.

Under the TSP, the modified stilling basin would remain a two stage system within the same footprint with the following modifications and features would be constructed within jurisdictional waters (See SDEIS Figure 3-4):

- A protective concrete apron overlay for the approximately 180+ feet of natural riverbed in the first stage between the dam and the existing stilling weir
- Demolition of the existing first stage baffle blocks, endsill and a portion of the existing apron slab and construction of new, larger, anchored blocks and resurfacing of the existing apron.
- Anchors in both the existing and new concrete slabs to stabilize against uplift pressures in the foundation created by underseepage from the reservoir
- Construction of new drainage features within the dam or first stage basin to relieve some of the uplift pressures

- Installation of stabilization anchors in the stilling weir and stilling basin training walls
- Installation of ten-foot high extensions of the existing spillway right and left training walls
- Addition of scour protection behind both stilling basin training walls
- Demolition/reconstruction and anchoring of the second stage concrete endsill and baffle blocks within their existing footprint to ensure stability and satisfactory performance
- Installation of means to remotely operate crest gates in order to reduce the life safety risk of dam operators during a flood event.
- Construction of a permanent divider wall to bisect stilling basin

In order to dewater the first and second stage stilling basin, a temporary cofferdam would be built across the downstream end of the second stage stilling basin. Several possible configurations for this cofferdam are under consideration. Regardless of the type of cofferdam used, this work would be accomplished in two stages, with half of the cofferdam being built and utilized for dewatering at one time. The right side (facing downstream) of the cofferdam would be built first, tying into the right penstock training wall, cross the channel downstream of the second stage baffle blocks, and tie into the cofferdam wall running perpendicular to the dam face. Once construction of the TSP is complete on the right side of the stilling basin, the right half of the cofferdam would be removed and the left side cofferdam would be built and utilized to dewater the left side of the stilling basin for construction of the TSP, tying into the left descending bank and the new divider wall.

One possible cofferdam design includes a series of steel sheet pile coffer-cells (Figure 3-7). In this configuration, the sheetpile face of the coffer-cells would not be driven below the ground surface; instead, the bottom of the pile cells would be placed on the surface of the riverbottom and filled with rock, the weight of which would aid against the sheetpile from moving up or downstream. To ensure that water is not able to seep under the sheetpiles, grout bags or a shallow layer of tremie concrete would be placed along the seam where the sheetpile meets the riverbed to seal any existing gaps. Between the end sill of the existing stilling basin and the interior portion of the cofferdam cells, a rock causeway would likely be placed first in advance of the cofferdam cells to facilitate construction of the cofferdam cells. The rock causeway would be within the footprint of the construction work limits on the upstream side of the cofferdam cells.

A second possible configuration of the cofferdam would be a rock causeway. Once one half of the first stage stilling basin is dewatered and flow is restricted, stone would be pushed out into the riverbed, starting from the dry land of either the right descending bank or existing phase 3 penstock cofferdam. Equipment would travel along the top of the causeway to continue the construction of the causeway until it connects to the cofferdam wall running perpendicular to the dam face. The downstream face of the rock causeway would be made watertight through the use of material such as a geomembrane, rip rap, or polypropylene bags filled with sand or rock. This reinforcement would also prevent erosion of the causeway, so that the material does not move downstream, The rock for the causeway would likely be durable orthoquartzite from excavation of the bedrock from the

spillway floor and/or durable limestone from a commercial source. This 404 (b)(1) evaluation is based on the second possible configuration, using rock and rip rap, as this configuration would have a wider direct impact footprint and represents the maximum adverse impact.

The TSP will also include the construction of a new fishing pier somewhere within the vicinity of the dam tailwaters. Once a location and design are determined, this 404(b)(1) evaluation may be amended if the construction of the pier requires the placement of fill material within waters of the U.S.

C. PURPOSE AND AUTHORITY. The purpose of the project is to address a possible failure mechanism to reduce the risk of failure of Bluestone Dam to achieve acceptable risk levels. A risk assessment was performed on the Bluestone Dam, including physical modeling and expert analysis, which classified Bluestone Dam as a Dam Safety Action Class (DSAC) II project. Class II is assigned to dams where failure could begin during normal operations or be initiated by the consequence of an event. Currently a Dam Safety Modification Study (DSMS) is underway.

Bluestone Dam and Reservoir was authorized by Executive Order (EO) 7183 in 1935 and the Flood Control Acts of 1936 and 1938 for the purposes of flood control, low flow augmentation, and hydroelectric power development. The purposes were later expanded to include recreation activities under the Flood Control Act of 1944 and fish and wildlife enhancement under the Fish and Wildlife Coordination Act of 1958. Recreation provides visitors with water related activities including fishing, hunting, boating, water skiing, and picnicking. The goals under the Fish and Wildlife Coordination Act of 1958, to include fish and wildlife conservation, are intended to promote the long-term wellbeing of populations of the plant and animal species native to the project area and the maximum sustained enjoyment of these populations by the public. More recently, Section 102(ff) of the Water Resource Development Act (WRDA) of 1992, as amended by Section 357 of WRDA 1996, further modified the original project authorization to address the accumulation and disposal of drift and debris at the dam. The National Dam Safety Act (Public Law [PL] 92-367) of August 1978 authorized USACE to review its projects for dam safety.

D. GENERAL DESCRIPTION OF DREDGED OR FILL MATERIAL

1. General Characteristics of Material. Fill material used in construction of the temporary cofferdam, divider wall, aprons and enlarged baffle blocks include concrete and rock. The rock would not be permanent fill; they would be used temporarily during construction (eight to ten years).
2. Quantity of Material. The following quantities of materials are estimated to be used in construction of the TSP.

Fill Type	Estimated Quantity	Temporary or Permanent Fill
Rock (2"-8")	19,000 cy	Temporary
Rip Rap	3,000 cy	Temporary
Concrete	100,000	Permanent

3. Source of Material. Rock for the causeway would likely be durable orthoquartzite from excavation of the bedrock from the spillway floor and/or durable limestone from a commercial source.. Concrete components will be sourced from existing commercial sources, and a batch plant will be utilized on-site to produce the concrete.

E. DESCRIPTION OF THE PROPOSED DISCHARGE SITES

1. Location. The permanent fill material would be placed within the existing stilling basin and baffle footprint of the Bluestone Dam. The temporary fill material would be placed approximately 105 feet downstream of the existing stilling weir.

2. Size. The permanent concrete fill would occupy approximately 5.5 acres within the existing stilling basin. The footprint of the temporary cofferdam would fill approximately 1.5 acres, with only 0.75 acre being filled at one time, as the cofferdam will only be built and utilized one half at a time. Approximately 1.75 acres of river (excluding the first stage of the stilling basin) would be dewatered within the cofferdam, though only half of that acreage would be dewatered at a given time.

3. Types of Sites. The area to be filled with concrete for the apron within the stilling weir is natural riverbottom, consisting primarily of flat bedrock and silt. Some concrete will be placed on demolished concrete. The area to be filled temporarily with rock and consists of sand, silt, gravel, cobble and boulder substrate.

4. Types of Habitat. Aquatic, riverine habitat would be impacted by placement of the fill material

5. Timing and Duration of Discharge. Half of the cofferdam would be constructed and remain in place for four to five years, during which time half of the concrete would be placed. This first half would be removed and the second half of the cofferdam would be constructed and remain in place for an additional four to five years while the second half of the concrete is placed. Exact timing of construction of the enlarged baffles is not known at this time, but it would be within the eight to ten-year construction period of the cofferdam and stilling weir apron.

DESCRIPTION OF DISPOSAL METHOD. Once one half of the first stage stilling basin is dewatered and flow is restricted, stone would be pushed out into the riverbed, starting from the dry land of either the right descending bank or existing phase 3 penstock cofferdam. Equipment would travel along the top of the causeway to continue the construction of the causeway until it connects to the cofferdam wall running perpendicular to the dam face. Several methods for conveyance of concrete necessary to construct the various features of the TSP are under consideration, any of which could be used during construction. The construction site would likely include a concrete batch plant on site, built in the location of the current plant on the right descending bank of the river. In order to transport concrete from an onsite batch plant to locations within the project site, one or several options may be used. An access road currently exists between the right descending bank of the river and the right training wall, on an earthen berm just downstream of the penstock area. Although this berm was scheduled for removal after completion of current construction on the penstocks, the removal could be delayed to allow for use of the access road for some portion of construction of the TSP. Use of this access road would allow for hauling to the right half of the stilling basin. In order to convey concrete to the left half of the stilling basin, a bridge may be built parallel to the face of the dam. Another option is construction of a braced mechanical conveyance system, which would run diagonally from the batch plant on the right descending bank to the left half of the stilling basin. This braced system could include temporary supports placed within the tailwater area. Consideration is also being given to construction of a batch plant on the left side of the stilling basin within the construction work limits.

III. FACTUAL DETERMINATIONS

A. PHYSICAL SUBSTRATE DETERMINATIONS

1. Substrate Elevation and Slope. The existing bottom of the stilling basin, baffles and riverbottom sits at elevation 1368. Average gradient of the New River between Bluestone Dam and Sandstone is 10 feet per mile.
2. Sediment Type. The riverbottom is primarily comprised of sand, silt, gravel, cobble and boulder.
3. Dredged/Fill Material Movement. Any movement of fill material would be insignificant. Best Management Practices (BMPs) would be used to minimize the risk of concrete entering the downstream area of the dam, outside of the cofferdam. Rock would be placed during low or no flow to minimize material displacement. Also, the downstream face of the rock causeway would be made watertight through the use of material such as a geomembrane, rip rap, or polypropylene bags filled with sand or rock. This reinforcement would prevent erosion of the causeway, so that the material does not move downstream,

4. Physical Effects on Benthos. Direct mortality of aquatic macrophytes, benthic invertebrates, mussels, and crayfish would occur during the placement of the cofferdam and subsequent dewatering. Habitat would be filled and dewatered for eight to ten years, causing a significant long-term, but non-permanent, reduction in riffle-run habitat. While BMPs would be implemented and strictly followed during construction, some turbidity could be caused by construction of the cofferdam, which could lead to sedimentation within habitats downstream of the cofferdam. Sedimentation would have the greatest effect on benthic invertebrates and mussels, smothering those individuals on which the sediment settles and causing stress and/or direct mortality. Excess sediments fill spaces between gravels, cobbles and boulders that normally serve as habitat for macroinvertebrates and spawning fish. As USACE will restore the area after construction completion, the habitat could recover over time.

5. Other Effects. No other effects are expected.

6. Actions Taken to Minimize Impacts. The footprint of temporary impact has been minimized to the maximum extent practical. Temporarily disturbed areas would be restored as soon as practical. Additionally, during construction of the TSP, the USACE would implement erosion and sedimentation BMPs within the construction area to minimize downstream impacts from sedimentation. BMPs include, but are not limited to, the following: installation of sediment and erosion control devices (e.g. silt fences, filter socks, temporary sediment control basins, erosion control matting); adequate and continued maintenance of sediment and erosion control devices to insure their effectiveness; siting of equipment staging, fueling, and maintenance areas outside of wetlands, streams, and riparian areas to the maximum extent practicable; and preventing sediment, debris, and pollutants from entering the New River as much as possible. Rock would be placed during low or no flow to minimize material displacement and suspension of riverbottom sediment. Also, the downstream face of the rock causeway would be made watertight through the use of material such as a geomembrane, rip rap, or polypropylene bags filled with sand or rock. This reinforcement would prevent erosion of the causeway, so that the material does not move downstream,

B. WATER CIRCULATION, FLUCTUATION, CHEMICAL, AND PHYSICAL DETERMINATIONS

1. Water. Placement of rock on the riverbottom could re-suspend waterbottom silts and sands, temporarily increasing turbidity. Aside from turbidity, the placement of fill material would not change the water quality within the project area. Concrete will be placed in dewatered areas, so no water quality impact from this placement is anticipated.

a. Salinity. No impacts anticipated.

b. Water Chemistry. No impacts anticipated.

c. Clarity. Increased turbidity and suspended solids would reduce the clarity of surface water in the immediate vicinity of fill material placement. This would be a temporary and localized condition. Clarity would return to preexisting conditions shortly after placement of temporary fill. Concrete fill would be placed within the stilling basin during a dewatered condition, so increased turbidity from concrete fill is not anticipated.

d. Color. Any changes in color would be temporary and minor, and would result from increased turbidity.

e. Odor. No impacts anticipated.

f. Taste. Drinking water is sourced from groundwater in this area of West Virginia rather than surface water, and the placement of fill will have no impact on groundwater resources.

g. Dissolved gas levels. Placement of temporary fill materials could result in decreases in dissolved oxygen in the immediate area as a direct response to increases in suspended solids and turbidities. However, turbidity is expected to subside shortly after placement and thus dissolved oxygen levels would return to preconstruction levels shortly afterward.

h. Nutrients. No introduction of nutrients is expected from placement of fill material.

i. Eutrophication. No eutrophication is anticipated.

j. Current pattern and circulation. The tailwater area downstream of the cofferdam could see an increase in the areas experiencing dry conditions during the lowest flow through the dam during construction. Under current operating conditions, the banks of the in-stream island near the right descending bank experience drying at low flows ranging from 610 to 2,500 cfs. A slightly larger area around the island would experience drying when either side of the cofferdam is in place during construction during low flow conditions. The greatest drying impact is predicted when the right side cofferdam is in place, with drying patterns emerging not only around the island but also downstream of the cofferdam between the cofferdam and the island. Approximately 62.5 acres of aquatic habitat could be indirectly impacted by the altered flow regime.

k. Velocity. Under current operating conditions, in which flow is released downstream evenly across the stilling weir, the area immediately downstream of the stilling weir experiences velocities ranging from 2 to 5 feet per second during flows ranging from 610 to 10,000 cfs, which is the most common flow range seen in most years. During flows ranging from 20,000 to 60,000 cfs, velocities downstream can reach as high as 9 feet per second.

Velocities would increase slightly at lower range flows during construction as compared to the current operating conditions due to the reduced weir length over which water would flow. For example, when the left cofferdam is in place, the tailwater area would be expected to start experiencing velocities of 6 feet per second or more during 10,000 cfs flows, whereas velocities would likely reach approximately 5 feet per second at that flow under normal conditions. The downstream area would be expected to start seeing velocities reaching 10 feet per second during 30,000 cfs flows during closure of the left cofferdam, whereas velocities would reach only approximately 9 feet per second during higher flows under current operating conditions. When the right cofferdam is in place, velocities would increase at lower flows than when the left cofferdam is in place; for example, velocities as high as 15 feet per second would be expected in some parts of the flow during extreme events (50,000 to 60,000 cfs) when the left cofferdam is closed, and at flows of 30,000 to 60,000 cfs when the right cofferdam is closed. These higher velocities, which could cause direct mortality of less mobile aquatic species or younger individuals of more mobile species, would be a slightly more common occurrence due to placement of the temporary fill.

l. Stratification. Stratification is not anticipated

m. Hydrologic regime. Placement of temporary fill material will alter the hydrologic regime, as described in sections (j) and (k) above. This alteration would cease after completion of construction.

n. Normal water level fluctuation. Placement of temporary fill will not directly impact normal water fluctuation in the New River downstream of the dam. However, the placement of the temporary fill material is part of an overall construction scheme, namely dewatering of half of the cofferdam and thus reduction in the number of sluice gates used to pass water through the dam, that could have an impact on the water level fluctuation on the upstream side of the dam. Bluestone Lake may experience an increased frequency, duration and/or elevation of “out of pool” conditions for eight to ten years.

o. Salinity gradients. No effect.

p. Actions Taken to Minimize Impacts. BMPs would be utilized to minimize the risk of inadvertent discharge of material into the New River. Concrete would be poured when the cofferdam is dewatered.

C. SUSPENDED PARTICULATE/ TURBIDITY DETERMINATIONS

1. Placement of rock on the riverbottom could re-suspend waterbottom silts and sands, temporarily increasing turbidity. However, rock would be placed during low and no flow, so this impact will be minimized.

a. Light penetration. Short-term reductions in light penetration are likely to occur during placement of temporary fill material. These reductions in light penetration are anticipated to be short term and localized to the area adjacent to construction operations.

b. Dissolved oxygen (DO). Placement of temporary fill material and the resulting increased turbidity could cause localized decreases in DO; however because placement would take place during low or low flow, this impact is expected to be insignificant.

c. Toxic metals and organisms. No toxic metals or organisms would be discharged during placement of fill material.

d. Pathogens. While coliform and enterococci bacteria may be present in project waters, project construction would not affect this condition.

e. Aesthetics. Area aesthetics would be temporarily degraded during the construction phase of the proposed project; however, the construction would occur within the industrial setting of the Bluestone Dam.

f. Pesticides. No toxic metals or organisms would be discharged during placement of fill material.

g. Effects on biota. Impacts to benthic species are discussed in section II.A.4. Additionally, the direct loss of prey species within the footprint of the temporary cofferdam could result in lower food abundance for fish species that normally inhabit the tailwater area. Approximately 62.5 acres of aquatic habitat could be impacted by the altered flow regime associated with the placement of the temporary fill. This drying temporarily reduces available aquatic habitat in the tailwater area, including instream and riparian cover such as rock outcrops, boulders, and cobble/pebble riffles. The altered flow regime could lead to the loss of emergent water willow and could cause stress and/or mortality of benthic invertebrates, macrophytes and mussels, some of which could be state-listed rare species. This drying could also cause displacement of species that use the riffle microhabitats found in these areas, such as bigmouth chub. Fish could also be trapped in small pools and, in warmer months, suffer from increased temperature and depleted oxygen stress. The altered flows could alter water quality, turbidity, and total organic carbon or biological oxygen demand. However, if low flow periods can be limited to no more than 24 hours at a time, impacts to downstream aquatic habitat from such drying would not be significant.

h. Suspension/filter feeders. Larval and juvenile forms of suspension and filter feeding organisms would be adversely affected on a localized and temporary basis, as the feeding structures could be damaged or the individuals could be smothered..

i. Sight feeders. No significant effects. These organisms are generally highly mobile and would avoid or escape areas of high turbidity during fill placement; however because placement would take place during low or low flow, this impact is expected to be insignificant.

j. Actions taken to minimize impacts. BMPs would be utilized to minimize the risk of inadvertent discharge of material into the New River. Rock will be placed during low or no flow, and concrete will be placed in dewatered areas.

D. CONTAMINATION DETERMINATIONS

The risk of contamination of waters resulting from the placement of fill material into waters located within the project area is low. Excavation and filling operations associated with this project are not expected to significantly affect the water chemistry of waters within the project area.

E. AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

1. Effects on Plankton. Any existing plankton in the immediate area of the placement of temporary fill operation would be adversely impacted due to elevated turbidity levels. The impacts would be localized and short-term. Because placement would take place during low or low flow, this impact is expected to be insignificant.

2. Effects on Benthos. Benthic impacts are discussed in item II.A.4.

3. Effects on Nekton. Alteration in the flow regime and the resulting drying of limited areas within the tailwater during low flows as a result of placement of temporary fill could cause displacement of species that use the riffle microhabitats found in these areas. Fish could also be trapped in small pools and, in warmer months, suffer from increased temperature and depleted oxygen stress. Increased velocity of water passing through the stilling basin during high flow events due to the placement of the temporary fill material could cause direct mortality of younger fish species, but such flows would not be common occurrences.

4. Effects on Aquatic Food Web. The loss of benthic species due to placement of the temporary fill material would reduce food abundance for fish and other species in the immediate tailwater area, but food is readily available further upstream and downstream.

5. Effects on Special Aquatic Sites. The tailwater area of the New River, just downstream of the stilling weir, is considered by USFWS as a Resource Category 1 habitat, which is defined under USFWS (Mitigation Policy 501 FW 2) as “high value for evaluation species and is unique and irreplaceable on a national basis or in the ecoregion section.” Approximately 2.25 acres of this high value habit would be

filled and dewatered. This area will be restored after removal of the cofferdam, and off-site mitigation will be completed to off-set the impacts.

a. Wetlands. No wetland delineation has been completed for the project footprint; however, the USFWS has not noted a need for mitigation of any vegetated wetlands.

b. Mudflats. Not applicable.

c. Vegetated shallows. Not applicable.

d. Coral reefs. Not applicable.

e. Riffle and pool complexes. The tailwater area is a riffle-run area with a gravel, cobble and boulder substrate. This area would be filled and dewatered for eight to ten years, after which time it will be restored and should return to pre-existing conditions.

6. Threatened and endangered species. No effect as none are known to exist within the footprint of the fill placement, and no critical habitat exists within the fill placement area.

7. Other wildlife. No wildlife aside from the aquatic species discussed in earlier sections would be directly impacted by fill placement.

8. Actions to minimize impacts. The footprint of the temporary fill has been minimized to the maximum extent practicable.

F. PROPOSED DISPOSAL SITE DETERMINATIONS

1. Mixing Zone Determinations. No water quality criteria would be exceeded by the placement of fill material as all material would be free of toxic pollutants; therefore, no mixing zone rule is applicable.

2. Determinations of Compliance with Applicable Water Quality Standards. Only temporary short-term impacts to water quality in the form of increased turbidity are anticipated as a direct result of temporary fill placement. These impacts include temporary increases in suspended solids and increases in turbidity levels which would occur during placement, but would subside for the remainder of the construction period. Because placement would take place during low or low flow, this impact is expected to be insignificant

3. Potential Effects on Human Use Characteristics.

a. Municipal and private water supply. No effects.

b. Recreational and commercial fisheries. Placement of the temporary fill material would require removal of the existing tailwater fishing pier on the left descending bank. However, an alternative fishing pier in the immediate area would be constructed to minimize the recreational impact of temporary fill placement. The impact to aquatic species due to fill placement is not expected to have a significant impact on the abundance of fish within the project area.

c. Water-related recreation. Aside from the impact to recreational fishing, no other water related recreational impacts would be caused by the placement of fill.

F. DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

1. The impacts caused by the placement of temporary fill would be in addition to any impacts to the aquatic ecosystem that has been caused by the previous and current construction at the Bluestone Dam. As BMPs have been used during such construction, thus minimizing impacts to the aquatic ecosystem, the cumulative impact of the placement of fill would not be expected to be greater than those discussed in earlier sections of this evaluation and the SDEIS.

G. DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM

1. No secondary effects are anticipated aside from the indirect impacts to the aquatic food web discussed in Section II.E.4.

IV. FINDING OF COMPLIANCE OR NONCOMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation.

B. Unavoidable project-induced adverse impacts to 50.94 aquatic Habitat Units of aquatic habitat would be fully mitigated by restoration of temporarily impacted habitat as well as off-site mitigation, as recommended by the U.S. Fish and Wildlife Service. Details regarding the requirements for this mitigation are provided in the U.S. Fish and Wildlife Service's Draft Mitigation Plan in Appendix H of the SDEIS.

C. The planned deposition of fill material would not violate applicable State Water Quality Standards (47CRS2, Requirements Governing Water Quality Standards for West Virginia; 9 VAC 25-260, Water Quality Standards for Virginia). Further, the planned fill action would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. No endangered species or their critical habitat will be adversely impacted by the planned action, as none are known to exist within the footprint of the fill placement.

E. The proposed deposition of fill material would not result in unacceptable adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. Further, as detailed in the SDEIS, the proposed discharges would not result in unacceptable adverse effects on the life stages of aquatic or semiaquatic organisms, the aquatic ecosystem, diversity, productivity, stability, recreation and esthetic resources, and economic values.

F. Appropriate steps to minimize potential adverse impacts of the fill action on aquatic systems include placement of concrete when the cofferdam is dewatered, use of BMPs and avoidance of discharges into open water where possible.

G. On the basis of the Section 404(b)(1) guidelines, the proposed sites for the deposition of fill material are specified as complying with the requirements of these guidelines.

Appendix J

AIR QUALITY ANALYSIS

Assumptions for Emissions - Construction Commuter and Trucking (on-road)					
Source	Fuel Type	Number of Vehicles	Miles Traveled per Day	Days of Travel per Year	Miles Traveled per Year
Passenger Cars	Gasoline	60	20	260	312,000
Passenger Trucks	Gasoline	60	20	260	312,000
Light Commercial Trucks	Gasoline	3	20	260	15,600
Light Commercial Trucks	Diesel	5	40	260	52,000
Short-Haul Trucks	Diesel	20	40	260	208,000
Long-Haul Trucks	Diesel	4	80	260	83,200

Short-Haul Trucks includes dump trucks and cement trucks

Long-Haul Trucks include semi-trailers

Construction Commuter and Trucking (on-road) Emissions (lbs/year) - Moves 2014a							
Source	VOC	CO	NO _x	PM-10	PM-2.5	SO ₂	CO ₂ and CO ₂ Equivalents
Passenger Cars	3550	24861	2925	39	35	2	280889
Passenger Trucks	5791	41311	4865	49	43	2	316321
Light Commercial Trucks	447	3536	395	4	3	0	28670
Short-Haul Trucks	15	3770	335	13	12	1	85992
Long-Haul Trucks	10	2008	166	8	7	1	59523
Total	9813	75486	8686	113	100	6	771395

Construction Commuter and Trucking (on-road) Emissions (tons/year) - Moves 2014a							
Source	VOC	CO	NO _x	PM-10	PM-2.5	SO ₂	CO ₂ and CO ₂ Equivalents
Passenger Cars	1.775	12.4305	1.4625	0.0195	0.0175	0.001	140.4445
Passenger Trucks	2.8955	20.6555	2.4325	0.0245	0.0215	0.001	158.1605
Light Commercial Trucks	0.2235	1.768	0.1975	0.002	0.0015	0	14.335
Short-Haul Trucks	0.0075	1.885	0.1675	0.0065	0.006	0.0005	42.996
Long-Haul Trucks	0.005	1.004	0.083	0.004	0.0035	0.0005	29.7615
Total	4.9065	37.743	4.343	0.0565	0.05	0.003	385.6975

Combustion Emissions (off-road) (tons/year) - Moves 2014a							
	VOC	CO	NO _x	SO ₂	CO ₂	PM-10	PM-2.5
lbs/day	2.883951	12.6451366	22.91798	0.031292	5550.409	1.897855	1.840919
lbs/year	720.9877	3161.284151	5729.494	7.822945	1387602	474.4636	460.2296
tons/year	0.360494	1.580642075	2.864747	0.003911	693.8011	0.237232	0.230115

Fugitive Dust Emissions (off-Road) (tons/year)				
	PM-10 uncontrolled	PM-10 controlled	PM-2.5 uncontrolled	PM-2.5 controlled
Construction Area (0.19 ton PM-10/acre)	11.4	5.7	1.14	0.57
Staging Areas	29.6	14.82	2.96	1.48
Total	41	20.52	4.1	2.05

Air Emissions Results							
Emission Source	Criteria Pollutants (tons per year)						
	VOC	CO	NO _x	PM-10	PM-2.5	SO ₂	CO ₂ and CO ₂ Equivalents
Combustion Emissions (off-road)	0.360494	1.580642075	2.864747	0.237232	0.230115	0.003911	693.8011
Construction Site-Fugitive Dust	NA	NA	NA	20.52	2.05	NA	NA
Construction Commuter & Trucking (on-road)	4.9065	37.743	4.343	0.0565	0.05	0.003	385.6975
Total Emissions	5.266994	39.32364208	7.207747	20.813732	2.330115	0.006911	1079.4986
De Minimis Threshold (1)	100	100	100	100	100	100	25,000

(1) Summers County is in attainment for all NAAQS; 40 CFR 93 Part 153 defines de minimis levels or the minimum threshold for which a conformity must be performed for various criteria pollutant.

On-road and off-road emissions were generated by USEPA preferred model MOVES2014a. MOVES simulates daily motor vehicle operations and produces emissions rates. MOVES emission rates include sources from engine combustion, tire wear, brake wear, evaporative fuel permeation, vapor venting and leaking (running and parking), and crankcase loss. Emissions rates are averages from a combination of vehicle operations such as: stop and go, highway travel, acceleration at on-ramps, parking, start-up, extended idle, etc. Emissions for nonroad equipment were modeled for the 2014 year. The VOC Emission Factors includes exhaust and evaporative emissions.

Data for some MOVES modeling inputs were gathered from West Virginia Department of Environmental Protection emissions inventory technical documentation (WVDEP 2011).

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

Emission Factor	Units	Source
General Construction Activities	0.19 ton PM-10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42 ton PM-10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM-10 emissions Assumed to be PM-2.5)	EPA 2001; EPA 2006
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Control Efficiency

	0.50	(assume 50% control Efficiency for PM-10 and PM-2.5 emissions)	EPA 2001; EPA 2006
--	------	--	--------------------

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Project Area	12 months	Conversion Factors 0.000022957	acres per sq. feet
Area	5 acres		

Staging Areas

Duration of Soil Disturbance in Project Area	12 months
Area	13 acres

Project Emissions (tons/year)				
	PM-10 uncontrolled	PM-10 controlled	PM-2.5 uncontrolled	PM-2.5 controlled
Construction Area (0.19 ton PM 10/acre-month)	11.4	5.7	1.14	0.57
Staging Area	29.6	14.82	2.96	1.48
Total	41	20.52	4.1	2.05

References:

- EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999*. EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.
- EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb. 2006 version) National Emission Inventory for Criteria and Hazardous Air Pollutants*. Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.
- MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1)*. Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month

Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No.1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

PM2.5 Multiplier

0.10

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5

0.50

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

- EPA 2001. Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999. EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.
- EPA 2006. Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants. Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.
- MRI 1996. Improvement of Specific Emission Factors (BACM Project No. 1). Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Appendix K

SOIL DESCRIPTIONS

Four major soil associations occur in the study area of Reconnaissance Area 1.

- ***Monongahela-Kanawha-Chagrin***-These soils are deep and moderately well to well drained and were formed in acid and lime-induced weathered materials. The slopes are nearly level to strongly sloping. The formation of these soils are along high and low floodplains and stream terraces. The Monongahela series has a medium textured, dark brown surface layer, with a medium to moderately fine textured, yellowish brown subsoil. The Kanawha series has a moderately coarse, dark brown surface layer and a moderately coarse to medium brown and reddish brown subsurface. The Chagrin soils have a medium textured, dark grayish brown loam surface layer. The subsoil is medium textured and dark brown loam. This soil association has a high available water capacity and moderate permeability.
- ***Shouns-Gilpin-Cateache-Berks***-The Shouns series consists of very deep, well drained, moderately permeable soils on uplands. These soils formed in colluvium from sandstone, siltstone, and shale. They are on the lower part of hillsides, benches, and foot slopes. Slopes range from 2 to 70 percent. The Gilpin series consists of moderately deep, well drained soils formed in residuum of nearly horizontal interbedded shale, siltstone, and some sandstone of the Allegheny Plateau. They are on gently sloping to steep, convex, dissected uplands. Slope ranges from 0 to 70 percent. Permeability is moderate. Mean annual precipitation is 43 inches, and mean annual air temperature is 51 degrees F. The Cateache series consists of moderately deep, well drained soils formed in residuum weathered mainly from red interbedded siltstone and shale. Slope ranges from 3 to 80 percent. Mean annual precipitation is 37.8 inches. Mean annual temperature is 53 degrees F. The Berks series consists of moderately deep, well drained soils formed in residuum weathered from shale, siltstone and fine grained sandstone on rounded and dissected uplands. Slope ranges from 0 to 80 percent. Permeability is moderate or moderately rapid. Mean annual precipitation is 42 inches. Mean annual temperature is 52 degrees F.
- ***Weikert-Litz-Clarksburg***- The Weikert series consist of shallow, well drained soils formed in material that weathered from interbedded gray and brown acid shale, siltstone, and fine-grained sandstone on gently sloping to very steep areas on uplands. Slope ranges from 0 to 100 percent. Permeability is moderately rapid. Mean annual precipitation is about 42 inches, and the mean annual air temperature is about 52 degrees F. The Litz series consists of moderately deep, well drained soils formed in residuum from leached calcareous shale and with widely spaced thin layers of limestone. These soils are found on upland ridges and sideslopes mainly in the Ridge and Valley areas of the Appalachians. Permeability is moderate. Slopes range from 2 to 80 percent. Mean annual temperature is about 53 degrees F and mean annual precipitation is about 44 inches. The Clarksburg series consists of

well drained soils formed from weathering of interbedded siltstone, sandstone, and limestone. Slopes range from 0 to 25 percent.

- ***Frederick-Carbo***-The Frederick series consists of very deep, well drained soils formed in residuum derived mainly from dolomitic limestone with interbeds of sandstone, siltstone, and shale. They are on are nearly level to very steep uplands. Permeability is moderate. Slopes range from 0 to 60 percent. Mean annual precipitation is about 42 inches, and mean annual temperature is about 55 degrees F. Soils of the Carbo series are moderately deep, well drained, and slowly permeable. They formed in material weathered from limestone bedrock. They are nearly level to very steep soils on uplands in the Appalachian Ridges and Valleys. Mean annual temperature is about 55 degrees F., and mean annual precipitation is about 40 inches. Slopes range from 2 to 65 percent.

Six major soil associations occur in the study area of Reconnaissance Area 2.

- ***Monongahela-Kanawha-Chagrin***-These soils are deep and moderately well to well drained and were formed in acid and lime-induced weathered materials. The slopes are nearly level to strongly sloping. The formation of these soils are along high and low floodplains and stream terraces. The Monongahela series has a medium textured, dark brown surface layer, with a medium to moderately fine textured, yellowish brown subsoil. The Kanawha series has a moderately coarse, dark brown surface layer and a moderately coarse to medium brown and reddish brown subsurface. The Chagrin soils have a medium textured, dark grayish brown loam surface layer. The subsoil is medium textured and dark brown loam. This soil association has a high available water capacity and moderate permeability.
- ***Muskingum***-The Muskingum series consists of moderately deep, well drained, moderately permeable soils formed in residuum weathered from interbedded siltstone, sandstone and shale. Slopes range from 2 to 75 percent
- ***Gilpin-Dekalb***-The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Dekalb series consists of moderately deep, excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F.

- **Rock outcrop-Gilpin-Dekalb**-The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Dekalb series consists of moderately deep, excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F.
- **Pineville-Gilpin-Dekalb-Buchanan**-The Pineville series consists of very deep, well drained soils with moderately rapid permeability. These soils formed in colluvium derived from sandstone, shale, and siltstone. Pineville soils are on mountain coves, lower sideslopes, and footslopes. Slope ranges from 8 to 80 percent but is dominantly 25 to 60 percent. Mean annual precipitation is 43 inches, and mean annual temperature is about 54 degrees F. The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Dekalb series consists of moderately deep, excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F. Soils of the Buchanan series are very deep, somewhat poorly and moderately well drained, and slowly permeable. They formed in colluvium on mountain footslopes, sideslopes and in valleys that is derived from acid sandstone, quartzite, siltstone, and shale. Slope ranges from 0 to 45 percent. Mean annual precipitation is about 105 cm (42 inches), and mean annual air temperature is about 12 degrees C (53 degrees F).
- **Shouns-Gilpin-Cateache-Berks**-The Shouns series consists of very deep, well drained, moderately permeable soils on uplands. These soils formed in colluvium from sandstone, siltstone, and shale. They are on the lower part of hillsides, benches, and foot slopes. Slopes range from 2 to 70 percent. The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Cateache series consists of moderately deep, well drained soils formed in residuum weathered mainly from red inter-bedded siltstone and shale. Slope ranges from 3 to 80 percent. Mean annual precipitation is 37.8 inches. Mean annual temperature is 53 degrees F. The Berks series consists of moderately deep, well drained soils formed in

residuum weathered from shale, siltstone and fine grained sandstone on rounded and dissected uplands. Slope ranges from 0 to 80 percent. Permeability is moderate or moderately rapid. Mean annual precipitation is 42 inches. Mean annual temperature is 52 degrees F.

Nine major soil associations occur in the study area of Reconnaissance Area 3.

- ***Urban land-Melvin-Lindside-Kanawha***-This complex consists of areas covered by urban structures such as asphalt, concrete, buildings, or other impervious materials. The Melvin series consists of deep, poorly drained soils formed in alluvial material washed from lime influenced and acid soils on uplands. Slopes range from 0 to 3 percent. Melvin soils are on the landscape with the well-drained Ashton, Huntington, and Kanawha soils and the moderately well drained Lindside soils. The Lindside series consists of deep, moderately well drained soils formed in alluvial material washed from lime-influenced and acid soils on uplands. The Lindside soils are located on flood plains. Slopes range from 0 to 5 percent, but are dominantly less than 3 percent. Lindside soils are on the landscape with the well-drained Ashton, Huntington, and Kanawha soils and the poorly drained Melvin soils. The Kanawha series consists of deep, well drained soils formed in alluvial material that washed from lime influenced and acid soils on uplands. The Kanawha soils are on high flood plains and low terraces. Slopes range from 0 to 8 percent. Kanawha soils are on the landscape with the well drained Ashton and Huntington soils, the moderately well drained Lindside soils, and the poorly drained Melvin soils.
- ***Upshur-Gilpin***-The Upshur soils are gently sloping to very steep and are on uplands. They formed in lime-influenced material weathered mainly from clay shale. Upshur soils have a reddish brown, moderately fine textured surface layer and a dark red, fine textured subsoil. The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil.
- ***Pineville-Gilpin-Dekalb-Buchanan***-The Pineville series consists of very deep, well drained soils with moderately rapid permeability. These soils formed in colluvium derived from sandstone, shale, and siltstone. Pineville soils are on mountain coves, lower sideslopes, and footslopes. Slope ranges from 8 to 80 percent but is dominantly 25 to 60 percent. Mean annual precipitation is 43 inches, and mean annual temperature is about 54 degrees F. The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Dekalb series consists of moderately

deep, excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F. Soils of the Buchanan series are very deep, somewhat poorly and moderately well drained, and slowly permeable. They formed in colluvium on mountain footslopes, sideslopes and in valleys that is derived from acid sandstone, quartzite, siltstone, and shale. Slope ranges from 0 to 45 percent. Mean annual precipitation is about 105 cm (42 inches), and mean annual air temperature is about 12 degrees C (53 degrees F).

- **Rock outcrop-Gilpin-Dekalb**-The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Dekalb series consists of moderately deep, excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F.
- **Gilpin-Dekalb**-The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil. The Dekalb series consists of moderately deep, excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F.
- **Pineville-Guyandotte-Dekalb**-The Pineville series consists of very deep, well drained soils with moderately rapid permeability. These soils formed in colluvium derived from sandstone, shale, and siltstone. Pineville soils are on mountain coves, lower sideslopes, and footslopes. Slope ranges from 8 to 80 percent but is dominately 25 to 60 percent. Mean annual precipitation is 43 inches, and mean annual temperature is about 54 degrees F. The Guyandotte series consists of well drained soils formed from neutral sandstone, shale, and siltstone. The Dekalb series consists of moderately deep and excessively drained soils formed in material weathered from gray and brown acid sandstone in places interbedded with shale and graywacke. Slope ranges from 0 to 80 percent. Permeability is rapid. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F.

- ***Pope-Craigsville-Chavies***-The Pope series consists of very deep and well drained soils formed in alluvium on flood plains. Permeability is moderate or moderately rapid. Slopes range from 0 to 4 percent. Mean annual precipitation is about 48 inches and mean annual air temperature is about 53 degrees F. near the type location. Soils of the Craigsville series are very deep and well drained to somewhat excessively drained. They formed in moderately coarse and coarse textured sediments. Permeability is moderately rapid or rapid. They are nearly level to gently sloping soils on flood plains. Slopes range from 0 to 5 percent. Mean annual temperature is about 50 degrees F., and mean annual precipitation is about 40 inches. The Chavies series consist of very deep, well drained soils formed in alluvium on flood plains. Slopes range from 0 to 55percent. Annual temperature is about 52 degrees F.
- ***Urban land-Laidig-Kanawha***-This is generally typical of urban areas and soils along the Kanawha River. The slope is nearly level and gently sloping. The Kanawha soils were formed in lime-influenced alluvial material intermingled with sandstone, shale and siltstone, washed from the upland soils. These soils are deep with a dark brown, moderately coarse surface layer and a dark yellowish brown, moderately coarse to medium textured subsoil.The Laidig series consists of very deep, well drained soils formed in colluvium from sandstone, siltstone, and some shale. They are gently sloping to very steep soils on benches and foot slopes. Permeability is moderate or moderately rapid above the fragipan and moderately slow or slow in the fragipan. Slope ranges from 0 to 55 percent. Near the type location, the mean annual precipitation is about 34 inches, and the mean annual temperature is about 51 degrees F.
- ***Vincent-Monongahela***-The Vincent series consists of deep, moderately well drained soils formed in alluvium and in lacustrine sediments washed from lime-influenced and acid soils on uplands. Slopes range from 3 to 15 percent. Vincent soils are on the landscape with the well-drained Allegheny soils, the moderately well drained Monongahela soils, the somewhat poorly drained Tyler soils, and the Udifluvents and Fluvaquents. The Monongahela series consists of deep, moderately well drained soils formed in alluvial material washed from acid soils on uplands. Slopes range from 3 to 15 percent. Mean annual precipitation is about 40 inches, and mean average temperature is about 52 degrees F.

Five major soil associations occur in the study area in Reconnaissance Area 4.

- ***Sciotoville-Melvin-Lakin-Ashton***-The Sciotoville series consists of very deep, moderately well drained soils that are shallow or moderately deep to a fragipan. These soils formed in old alluvium. They are on terraces. Slope

ranges from 0 to 25 percent. Mean annual precipitation is about 42 inches, and mean annual air temperature is about 54 degrees F.

The Melvin series consists of deep, poorly drained soils formed in alluvial material washed from lime influenced and acid soils on uplands. The Melvin soils are on flood plains along the Kanawha River. The flooding frequency of these soils has been reduced by flood-control structures on the Kanawha River System. Slopes range from 0 to 3 percent. Melvin soils are on the landscape with the well-drained Ashton, Huntington, and Kanawha soils and the moderately well drained Lindsides soils.

The Lakin series consists of very deep, excessively drained soils formed in coarse textured eolian or water-laid materials. Lakin soils are located dominantly on the leeward side of major stream valleys. Permeability is rapid. Slope ranges from 0 to 40 percent. Mean annual precipitation is about 38 to 44 inches and mean annual air temperature is about 50 degrees to 57 degrees F.

The Ashton series consists of deep, well drained soils formed in alluvial material washed from soils on uplands. The Ashton soils are on high flood plains along the Kanawha River. Slopes range from 0 to 8 percent. Ashton soils are on the landscape with the well-drained Huntington and Kanawha soils, the moderately well drained Lindsides soils, and the poorly drained Melvin soils.

- ***Upshur-Gilpin***-The Upshur soils are gently sloping to very steep and are on uplands. They formed in lime-influenced material weathered mainly from clay shale. Upshur soils have a reddish brown, moderately fine textured surface layer and a dark red, fine textured subsoil.

The Gilpin soils are strongly sloping to very steep and are on uplands. They formed in acid material weathered from interbedded siltstone, shale, and sandstone. Gilpin soils have a very dark grayish brown and yellowish brown, medium textured surface layer and a strong brown, medium and moderately fine textured subsoil.

- ***Urban land-Melvin-Lindsides-Kanawha***- This complex consists of areas covered by urban structures such as asphalt, concrete, buildings, or other impervious materials. The Melvin series consists of deep, poorly drained soils formed in alluvial material washed from lime influenced and acid soils on uplands. The Melvin soils are located on floodplains. Slopes range from 0 to 3 percent. Melvin soils are on the landscape with the well-drained Ashton, Huntington, and Kanawha soils and the moderately well drained Lindsides soils. The Lindsides series consists of deep, moderately well drained soils formed in alluvial material washed from lime-influenced and acid soils on uplands. Slopes range from 0 to 5 percent, but are dominantly less than 3

percent. Linside soils are on the landscape with the well-drained Ashton, Huntington, and Kanawha soils and the poorly drained Melvin soils. The Kanawha series consists of deep, well drained soils formed in alluvial material that washed from lime influenced and acid soils on uplands. The Kanawha soils are on high flood plains and low terraces. Slopes range from 0 to 8 percent. Kanawha soils are on the landscape with the well-drained Ashton and Huntington soils, the moderately well drained Linside soils, and the poorly drained Melvin soils.

- **Sciotoville-Melvin-Lakin-Ashton-**The Sciotoville series consists of very deep, moderately well drained soils that are shallow or moderately deep to a fragipan. These soils formed in old alluvium. They are on terraces. Slope ranges from 0 to 25 percent. Mean annual precipitation is about 42 inches, and mean annual air temperature is about 54 degrees F.

The Melvin series consists of deep, poorly drained soils formed in alluvial material washed from limeinfluenced and acid soils on uplands. The Melvin soils are located on flood plains. Slopes range from 0 to 3 percent. Melvin soils are on the landscape with the well-drained Ashton, Huntington, and Kanawha soils and the moderately well drained Linside soils. The Lakin series consists of very deep and excessively drained soils formed in coarse textured eolian or water-laid materials. Lakin soils are located dominantly on the leeward side of major stream valleys. Permeability is rapid. Slope ranges from 0 to 40 percent. Mean annual precipitation is about 38 to 44 inches and mean annual air temperature is about 50 degrees to 57 degrees F.

The Ashton series consists of deep, well drained soils formed in alluvial material washed from soils on uplands. Slopes range from 0 to 8 percent. Ashton soils are on the landscape with the well-drained Huntington and Kanawha soils, the moderately well drained Linside soils, and the poorly drained Melvin soils.

- **Vandalia-Senecaville-Hackers-** The Vandalia soils are strongly sloping to steep. They are on foot slopes and at the heads of drainageways. They formed in lime-influenced and acid colluvial material that moved downslope mainly from Gilpin and Upshur soils on uplands. Vandalia soils have a reddish brown, medium textured surface layer and a reddish brown, moderately fine and fine textured subsoil. The Senecaville soils are nearly level and moderately well drained. They are on flood plains. The Hackers series consists of deep, well drained soils formed in alluvial material washed from lime influenced and acid soils on uplands. The Hackers soils are located on high flood plains. Slopes range from 0 to 8 percent. Hackers soils are on the landscape with the well-drained Moshannon and Sensabaugh soils and the moderately well drained Senecaville and Zoar soils.

Appendix L

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT



**US Army Corps
of Engineers**
Huntington District



**PHASE I ENVIRONMENTAL SITE ASSESSMENT
BLUESTONE DAM
CONTRACTOR WORK LIMITS (CWL)
DAM SAFETY MODIFICATION STUDY
HINTON, WEST VIRGINIA
JUNE 2016**

**PHASE I ENVIRONMENTAL SITE ASSESSMENT
BLUESTONE DAM
CONTRACTOR WORK LIMITS (CWL)
FOR DAM SAFETY MODIFICATION STUDY
HINTON, WV
JUNE 2016**

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APPENDICES

APPENDIX A - Project Mapping

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**PHASE I ENVIRONMENTAL SITE ASSESSMENT
BLUESTONE DAM
CONTRACTOR WORK LIMITS (CWL)
FOR DAM SAFETY MODIFICATION STUDY
HINTON, WV
JUNE 2016**

Acronym List

AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
CELRH EC-CE	Environmental and Remediation Section of the Huntington District, United States Army Corps of Engineers
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CWL	Contractor Work Limits
DSMS	Dam Safety Modification Study
EDR	Environmental Data Resources
EM	Engineering Manual
EPCRA	Emergency Planning and Community Right to Know Act
ER	Engineering Regulations
ERGO	Environmental Review Guide for Operations
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FINDS	Facility Index System
HTRW	Hazardous, Toxic, and Radioactive Waste
LUST	Leaking Underground Storage Tank
NPL	National Priorities List
QCP	Quality Control Plan
RCRIS-LQG	Resource Conservation and Recovery Information System – Large Quantity Generators
RCRIS-SQG	Resource Conservation and Recovery Information System – Small Quantity Generators
RCRIS-TSD	Resource Conservation and Recovery Information System – Treatment, Storage and Disposal Facilities
REC	Recognizable Environmental Concerns
SHWS	State Hazardous Waste Sites
SSHP	Site Safety and Health Plan
SWF/LF	Solid Waste Facility/Landfill Facilities
TCLP	Toxicity Characteristic Leaching Procedure
USACE	United States Army Corps of Engineers
UST	Underground Storage Tank

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) conducted a Phase I Environmental Site Assessment (ESA) on the Contractor Work Limits (CWL) for the Dam Safety Modification Study (DSMS) being conducted for Bluestone Dam. The DSMS will determine what construction activities will be performed to alleviate deficiencies of the Bluestone Dam stilling basin, designated as Phase 5 construction. The purpose of the Phase I ESA was to identify the potential presence of hazardous, toxic, or radioactive waste (HTRW) contamination in the CWL. The investigation was performed in accordance with ASTM E 1527-15 and 1528-14 Standards, USACE Huntington District ISO 9001 procedures, and USACE HTRW policies.

Environmental professionals conducted the field investigation of the proposed CWL in March and May 2016. During the physical inspection, the ground surface of the area was examined for signs of contamination. Specific indicators of possible environmental contamination include stained soil, stressed vegetation, surface debris, underground storage tank (UST) fill caps or vent lines, and unusual ground depressions or formations. The site reconnaissance also included the assessment of the potential for contamination from activities on adjacent areas. Color photographs of the characteristics of the area were taken during the site assessment.

Title ownership was researched on the non-Federal portion of the CWL between State Route 20 and the New River downstream of the dam. The bulk of the property in the CWL is owned by the Federal Government and has been since the 1940s. Interviews were conducted with USACE Bluestone Dam project personnel to obtain specific information about past activities and current conditions on the sites. Records of regulatory agencies listing recognized environmental conditions in connection with the properties were accessed through Environmental Data Resources Inc., a commercial database retrieval company located in Milford, CT. The current US Geological Survey (USGS) 7.5-minute topographic map and historic USGS topographic maps were obtained and reviewed as part of the ESA.

Based on this assessment, there are no environmental concerns that would impact construction activities in the present CWL. It is recommended that current Phase 3 and Phase 4 construction activities be monitored for any incidents that might environmentally impact future construction activities on the USACE project. If the design plans undergo further changes to include any additional areas for Phase 5 construction or mitigation, then those properties will have to be evaluated for any HTRW concerns.

**PHASE I ENVIRONMENTAL SITE ASSESSMENT
BLUESTONE DAM
CONTRACTOR WORK LIMITS (CWL)
DAM SAFETY MODIFICATION STUDY
HINTON, WV
JUNE 2016**

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) conducted a Phase I Environmental Site Assessment (ESA) on the Contractor Work Limits (CWL) for the Dam Safety Modification Study (DSMS) of Bluestone Dam. The DSMS and subsequent construction activities will address the deficiencies of the current stilling basin. The purpose of the Phase I ESA was to identify the potential presence of hazardous, toxic, or radioactive waste (HTRW) contamination in the CWL. The investigation was performed in accordance with ASTM E 1527-15 and 1528-14 Standards, USACE Huntington District ISO 9001 procedures, and USACE HTRW policies.

1.1 Project History

The Bluestone Dam is located near Hinton in Summers County, West Virginia, on the New River, one mile upstream from the confluence with the Greenbrier River. Bluestone Dam was constructed in the 1940's. The original design intent was to provide flood control for the Kanawha River Basin and hydroelectric power generation capacity. At the height of World War II, construction efforts were temporarily suspended because of labor and steel shortages. Once construction was re-initiated, the hydroelectric power function of the dam was revisited. It was decided at that time to only install the six, 19-foot diameter penstocks and indefinitely delay the powerhouse and turbine construction. The dam is a straight, concrete gravity structure with a maximum height above stream channel of about 165 feet. The main body of the dam consists of the left and right abutment sections, the spillway section, assembly bay section, powerhouse intake section, and the non-overflow section. The original conservation pool was 1,490 feet assuming a hydroelectric function. Because the dam currently serves as a flood control structure only, the operating pools are 1,406 feet during winter months and 1,410 feet during summer months. The pool of record for the facility is elevation 1,506 feet, which occurred during a storm event in 1960.

In 1998, the Huntington District received approval to modify the dam to safely pass a Probable Maximum Flood (PMF) event. Construction efforts under the approved plan have been divided into manageable contracts. Five construction contracts have been awarded to date. Phase 1, Phase 2A, and Phase 2B construction efforts are complete. Phase 3 and Phase 4 are currently ongoing. Following are brief descriptions of the work within each of the current construction phases.

- a) Phase 1 – Construction of mass concrete thrust blocks at the toe of the penstock monoliths and 3 hydraulically actuated bulkheads were installed at the end of the penstock to allow for the release of additional discharge.
- b) Phase 2A – Installation of a swing gate closure across State Route 20, east abutment gravity wall and other miscellaneous items.
- c) Phase 2B – Installation of 216 high strength steel strand anchors in the dam and 3 hydraulically actuated bulkheads which completed the installation of the bulkheads from Phase 1.
- d) Phase 3 - Construction of a penstock discharge scour protection stilling basin.
- e) Phase 4 - Installation of 278 high strength steel strand anchors in the dam.
- f) Phase 5 - Current DSMS to address remaining deficiencies.

1.2 Project Overview

The DSMS and subsequent Phase 5 construction will address the potential scouring of the current unlined stilling basin, and confinement of the outflow through the spillway during the PMF. The CWL will allow access to the spillway from both sides of the river downstream of the dam, and the backside of the dam if required.

1.3 Limitations of Investigation

The investigations were performed based solely upon information available to the USACE Huntington District, Environmental and Remediation Section (CELRH-EC-CE) at the time of the investigation. Services for the Phase I ESA did not include sampling, testing, and/or analyses to conclusively ascertain that contamination exists or is absent at or near the project site. Information concerning environmentally-sensitive incidents was gathered based on state and federal databases available for public review and interviews with current owners, occupants, utility company personnel, and/or regulatory agency personnel. No warranties or certifications can be provided by CELRH-EC-CE concerning the accuracy or completeness of all the information reviewed during the investigations.

The determination of potential HTRW contamination should not be considered as a definite assertion that an environmentally-sensitive condition actually exists. The conclusions and recommendations presented herein are based on information gathered using that degree of care and skill ordinarily exercised under similar circumstances by competent members of the environmental profession and no warranties are expressed or implied.

Furthermore, no ESA can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property. Conducting a Phase I ESA is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions and this assessment recognizes reasonable limits of time and cost. In addition, appropriate inquiry does not mean an exhaustive assessment of a property. At some point, the

cost of information obtained or the time required to gather it outweighs the usefulness of the information and in fact may be a material detriment to the orderly completion of transactions. Furthermore, subsequent ESAs should not be considered valid standards to judge the appropriateness of any prior assessment based on hindsight, new information, use of developing technology or analytical techniques, changing regulatory or industry standards, or other factors.

1.4 Scope of Work and Investigative Procedures

In accordance with USACE HTRW Policy and current ISO 9001 procedures and work instructions, a Quality Control Plan (QCP) and a Site-Specific Safety and Health Plan (SSHP) were developed and implemented during all phases of this investigation. Procedures and documentation of the QCP are enclosed in Appendix F. A copy of the SSHP is located in Appendix G.

The following sections describe the general procedures used for the scope of this investigation. Site-specific findings are discussed in Section 2.0 below.

1.4.1 Site Assessment

The fieldwork for the investigation consisted of site visits to observe the conditions of the properties with regard to recognizable environmental concerns (RECs). Environmental professionals physically investigated the area on 24 March 2016, and 18 May 2016. During the physical inspection, the ground surface was examined for signs of contamination. Specific indicators of possible environmental contamination include stained soil, stressed vegetation, surface debris, underground storage tank (UST) fill caps or vent lines, and unusual ground depressions or formations. The site reconnaissance also included the assessment of the potential for contamination on the property due to activities on adjacent properties. Site assessment interviews were completed for this area and are located in Appendix H. Color photographs of the area and of features considered to be possible RECs were taken to supplement written records of the visual observations. These photographs are located in Appendix I.

1.4.2 Interviews

The field investigations were supplemented by interviewing USACE personnel who work at Bluestone Dam. These interviews were performed in order to obtain information about current and previous usage of the properties and about activities associated with environmentally sensitive incidents. Interviews with project personnel are documented in Appendix H.

The following individuals were interviewed:

- Dean Bonifacio, Park Manager, Bluestone Dam
- Whitfield Lance, Construction Inspector, Bluestone Construction RE Office
- John Atkins, Construction Inspector, Bluestone Construction RE Office

1.4.3 Records of State and Federal Agencies

A site map showing the locations of the area was used to obtain federal and state records of environmentally-sensitive incidents and activities in the immediate vicinity of the project area. Federal and state databases were accessed through a commercial database retrieval company.

Records of regulatory agencies listing RECs in connection with the properties were accessed through Environmental Data Resources (EDR), Inc., a commercial database retrieval company located in Milford, Connecticut. The information ascertain provided by EDR is located in Appendix C. Results of the EDR search of available (“reasonable ascertainable”) government records in the proximity of these tracts for the following databases are presented in the following sections. Detailed information regarding the nature and function of these databases is included with the search report.

The target property was found in the following databases:

- RCRA-CESQG – Resource Conservation and Recovery Act Conditionally Exempt Small Quantity Generator
- FINDS - Facility Index System
- ECHO – EPA Enforcement and Compliance History Online
- NY MANIFEST
- WV UST

The first three databases indicate that Bluestone Dam is listed under these programs; there is no present violations, or non-compliance under these programs. Bluestone Dam is listed under the NY Manifest program for disposing of lead contaminated paint removed from the structure to a NY hazardous waste landfill in 1996. The WV UST database indicates that at one time, Bluestone Dam had three underground storage tanks at its facilities. These tanks were removed and the site closed out in 1992.

No mapped sites were found within the search radius around the target property for the following databases:

- Federal
 - NPL – National Priority List
 - Proposed NPL – Proposed National Priority List Sites
 - NPL LIENS – Federal Superfund Liens
 - Delisted NPL – National Priority List Deletions
 - FEDERAL FACILITY – Federal Facility Site Information listing
 - SEMS – Superfund Enterprise Management System
 - SEMS-ARCHIVE – Superfund Enterprise Management System Archive
 - CORRACTS – corrective Action Report
 - CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Information System

- CERC-NFRAP – CERCLIS No Further Remedial Action Planned
- LIESN 2 – CERCLA Lien Information
- CORRACTS – Corrective Action Report
- RCRA-TSDF - Resource Conservation and Recovery Act Treatment, Disposal, or Storage Facility
- RCRA-LQG – Resource Conservation and Recovery Act Large Quantity Generator
- RCRA-SQG - Resource Conservation and Recovery Act Small Quantity Generator
- LUCIS – Land Use Control Information System
- US ENG CONTROLS – Engineering Controls Sites List
- US INST CONTROL – Sites with Institutional Controls
- ERNS – Emergency Response Notification System
- RCRA-NonGen - Resource Conservation and Recovery Act Non Generators
- FUDS – Formerly Used Defense Sites
- SCRDRYCLEANERS – State Coalition for Remediation of Drycleaners Listing
- US FIN ASSUR – Financial Assurance Information
- EPA WATCH LIST – EPA Watch List
- 2020 COR ACTION – 2020 Corrective Action Program List
- TSCA – Toxic Substances Control Act
- TRIS – Toxic Chemical Release Inventory System
- SSTS – Section 7 Tracking System
- ROD – Record of Decision
- RMP – Risk Management Plans
- RAATS – RCRA Administrative Action Tracking System
- PRP – Potentially Responsible Parties
- PADS – PCB Activity Database System
- ICIS – Integrated Compliance Information System
- FTTS – FIFRA/TSCA Tracking System
- MLTS – Material Licensing Tracking System
- COAL ASH DOE – Steam-Electric Plant Operation Data
- COAL ASH EPA – Coal Combustion Residues Surface Impoundments List
- PCB TRANSFORMER – PCB Transformer Registration Database
- RADINFO – Radiation Information Database
- HIST FTTS – FIFRA/TSCA Tracking System Administrative Case Listing
- DOT OPS – Incident and Accident Data
- CONSENT – Superfund (CERCLA) Consent Decrees
- INDIAN RESERV – Indian Reservations
- FUSRAP – Formerly Utilized Sites Remedial Action Program
- UMTRA – Uranium Mine Tailings Sites
- LEAD SMELTERS – Lead Smelter Sites

- US AIRS – Permitted Facility and Emissions Listing
- US MINES – Mines Master Index File
- UXO – Unexploded Ordinance Sites
- DOCKET HWC – Hazardous Waste Compliance Docket Listing

- State and Local Records
 - WV SWF/LF – List of M.S.W. Landfills/Transfer Station Listing
 - WV LCP – Landfill Closure Program
 - WV LUST – Leaking Underground Storage Tanks
 - INDIAN LUST – LUST on Indian Land
 - FEMA UST – Underground Storage Tank Listing
 - WV AST – Aboveground Storage Tanks
 - INDIAN UST – Underground Storage Tanks on Indian Land
 - WV INST CONTROL – Sites with Institutional Controls
 - WV VCP – Voluntary Remediation Sites
 - INDIAN VCP – Voluntary Cleanup Priority Listing
 - WV BROWNFIELDS – Brownfields Sites Listing
 - US BROWNFIELDS – A Listing of Brownfields Sites
 - INDIAN ODI – Report of the Status of Open Dumps on Indian Lands
 - ODI – Open Dump Inventory
 - DEBRIS REGION 9 – Torres Martinez Reservation Illegal Dump Site Locations
 - US HIST CDL – Delisted National Clandestine Laboratory Register
 - WV CDL – Drug Lab Site Locations
 - US CDL – National Clandestine Laboratory Register
 - LIENS 2 – CERCLA Lien Information
 - HMIRS – Hazardous Material Information Reporting System
 - WV SPILLS – Spills Listing
 - WV AIRS – Permitted Facility and Emissions Listing
 - WV COAL ASH – Coal Ash Landfills
 - WV DRYCLEANERS – Listing of Drycleaner Locations
 - WV Financial Assurance – Financial Assurance Information Listing
 - WVPNDES – Wastewater Discharge Permits Listing
 - WVUIC – Underground Injection Wells
 - FUELS PROGRAM – EPA Fuels Program Registered Listing

- EDR Proprietary Historical Databases
 - EDR MGP – EDR Proprietary Manufactured Gas Plants
 - EDR Historical Auto Stations – EDR Proprietary Historic Gas Stations
 - EDR Historical Cleaners – EDR Proprietary Historic Dry Cleaners

- EDR Recovered Government Archives
 - WV RGA LF – Recovered Government Archive Solid Waste Facilities List

- WV RGA LUST – Recovered Government Archive Leaking Underground Storage Tank
- Additional Environmental Records
 - DOD – Federally owned or administered lands, administered by the Department of Defense, that have any area equal or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Due to poor or inadequate address information, two sites could not be plotted by EDR. Unplottable sites were reported in the WV NPDES, FINDS, and ECHO databases. Both are listed as BLUESTONE DAM – DAM SAFETY ASSURANCE. The WV NPDES indicates a water discharge permit required by the Phase 3 Contractor during construction. The FINDS and ECHO are listings for the Contractors during the Dam Safety Assurance construction. There is no present violations, or non-compliance under these programs. Information collected on the orphan sites is summarized in the EDR search reports in Appendix C.

1.4.4 Ownership History

In accordance with CELRH-EC-CE ISO 9001 Work Instruction 3.36.2, Section 6.4, ownership histories were developed for the properties not owned by the Federal government. These properties are located between State Route 20 and the New River downstream of the dam, on the left descending bank. Except for the time that the properties were owned by the State of West Virginia for the relocation of State Route 20 during construction of Bluestone Dam, they have been owned by private individuals. These properties had no development prior to Coastal Drilling leasing the area for an office and warehouse during Phase 4 construction.

1.4.5 Other Phase I HTRW Investigation Reports

A Phase I ESA was performed by CELRH-EC-CE in February 1998 prior to the initial construction activities (Phase 1); this report is out of date, requiring the new ESA. No Phase II Investigations have been performed in this area.

1.4.6 ERGO Report

An environmental compliance review of Bluestone Dam was conducted on 8-10 August 2006 by a multidisciplinary team from the Huntington District based upon the Environmental Review Guide for Operations (ERGO) manual (January 1994), developed by Headquarters, US Army Corps of Engineers (HQUSACE). This review is to ensure that routine business of the Operations project are in compliance with all Federal, State and local environmental laws, regulations, and directives. This review provides a record of the environmental health of the project on the record date, as well as providing a basis against which progress can be measured. The ERGO Report is located in Appendix D.

The environmental compliance review considered twelve major environmental compliance categories, with special emphasis to those pertinent to the site. The twelve categories are:

- Category I – Air Emissions Management
- Category II – Cultural & Historic Resources Management
- Category III – Hazardous Materials Management
- Category IV – Hazardous Waste Management
- Category V – Natural Resource Management
- Category VI – Pesticide Management
- Category VII – Petroleum, Oil, & Lubricant Management
- Category VIII – Solid Waste Management
- Category IX – Special Pollutants Management: Radon, PCBs, Asbestos & Noise
- Category X – Underground Storage Tanks (USTs) Management
- Category XI – Waste Water Management
- Category XII – Water Quality Management

No significant, major or minor findings of non-compliance were noted at Bluestone Dam during the review. The scrapyard mentioned under Category VIII was located outside the CWL and has been removed. The outgranted facilities noted in the report (AEP flyash disposal area, Bluestone raw water treatment plant, and the wildlife management area) are not located within the CWL. The next ERGO review should be performed mid-year of 2016.

1.4.7 Historical Mapping

The purpose of a historical records search is to determine the past usage of each site. Aerial photographs were obtained for this report (included in Appendix B) dated 2011, 2009, 2007, 1996, 1990, 1976, 1967, and 1960. The aerial photographs do not indicate any present or historic activities that would cause HTRW concerns in the CWL. Historical topographic maps (included in Appendix B) dated 2014, 1998, 1976, 1968, 1914, 1912, 1892, and 1887 were obtained and reviewed. The 1914, 1912, 1892, and 1887 topographic maps show the area prior to Bluestone Dam being constructed. The other topographic maps (2014, 1998, 1976, and 1968) do not indicate any present or historic activities that would cause HTRW concerns in the CWL.

1.4.8 Orphan Sites

Due to poor or inadequate address information, two sites could not be plotted by EDR. Unplottable sites were reported in the WV NPDES, FINDS, and ECHO databases. Both are listed as BLUESTONE DAM – DAM SAFETY ASSURANCE. The WV NPDES indicates a water discharge permit required by the Phase 3 Contractor during construction. The FINDS and ECHO are listings for the Contractors during the Dam Safety Assurance construction. Information collected on the orphan sites is summarized in the EDR search reports in Appendix C.

1.4.9 Development of Conclusions and Recommendations

Using the investigative tools outlined above, conclusions and recommendations regarding the potential for contamination were made for this property. Recommendations may include Phase II(a) and/or other intrusive investigations in order to conclusively determine contamination presence. Based on the information obtained, the area was also evaluated for signs which may exhibit potential contamination that would require mitigation measures in accordance with federal and state law, but for which additional HTRW investigations are not recommended at this time.

2. INVESTIGATIVE FINDINGS, CONCLUSIONS, and RECOMMENDATIONS

Following the procedures outlined above, a Phase I ESA was performed on the Contractor Work Limits (CWL) for the Bluestone Dam DSMS. The DSMS and subsequent construction activities will address the deficiencies of the current stilling basin. In accordance with Corps of Engineers policy for HTRW investigations, a Quality Control Plan (QCP) and Site-Specific Safety and Health Plan (SSHP) were developed and implemented prior to and during all phases of this ESA. Procedures and documentation of the QCP are enclosed in Appendix F. A copy of the SSHP is in Appendix G. Records of the interviews and site assessment questionnaires can be found in Appendix H and color photos from the site visits are located in Appendix I. The following sections summarize the findings, conclusions, and recommendations for the CWL.

2.1 CWL Area

The CWL area is outlined on Figure 3 in Appendix A and takes in all of the property required for a Contractor to address the deficiencies of the current stilling basin. The upstream portion of the CWL includes the area immediately behind the dam, the left descending bank upstream to the Corps boat ramp and dock, and the wide areas adjacent to State Route 20 between the boat ramp and present RE Office (Appendix I, Photos BLN01 to BLN06). The downstream portion of the CWL includes the areas authorized by the Corps for the Phase 3 construction exclusive of the Emergency Spillway (Appendix I, Photos BLN07 to BLN16), Phase 4 construction (Appendix I, Photos BLN17 to BLN18), the properties located adjacent to State Route 20 downstream of the dam on the left descending bank (Appendix I, Photos BLN19 to BLN21), and the parking area adjacent to the dam on the left abutment (Appendix I, Photo BLN22).

2.1.1 Phase I Investigation Results

On 24 March 2016, and 18 May 2016, site visits were made to assess the CWL for Phase 5 construction. Site mapping is included in Appendix A. Site photos are included in Appendix I. the following observations were noted during the site visit.

The Phase 3 Contractor, Brayman Construction Company, operates on the right bank of the New River downstream of the dam. During the site visit, a petroleum containment area was observed (Appendix I, Photos BLN13 and BLN14). No spills or stained areas were observed outside of the containment area. Several diesel ASTs were observed around the emergency stilling basin utilized to refuel the compressors, generators, and cranes (Appendix I, Photos BLN15 and BLN16). No staining was observed near the ASTs.

The Phase 4 Contractor, Coastal Drilling, operates on the left bank of the New River downstream of the dam. The Contractor's CWL includes the left bank adjacent to the stilling basin and the spillway section of the dam (Appendix I, Photo BLN17). During the site visit, no environmental concerns were observed in this area.

A portion of the CWL includes property between State Route 20 and the New River from the State Route 3 Bridge to the fishing pier road (Appendix I, Photos BLN19 to BLN21). The property is comprised of four separate tracts owned by the following:

- State Road Commission (State of WV); Map 11, parcel 158
- Jerry and Nannie Kirk; Map 11, parcel 150
- John and Wilma Angotti; Map 11, parcel 150.1
- Mary Meadows; Map 11, parcel 159

A map of the tracts is located in Appendix A (Figure 4). The ownership histories are located in Appendix E. These properties have always been owned by private individuals, except during construction of Bluestone Dam when the State of WV purchased the property to relocate State Route 20. Prior to the Phase 4 construction activities, these properties were undeveloped. Coastal Drilling purchased easements on these properties to place their office trailers, warehouse, and fenced yard (Appendix I, Photos BLN19 and BLN20). During the site visit, no environmental concerns were observed on these properties.

Dean Bonifacio is Park Manager for Bluestone Dam and has worked there since 1990. During his interview he stated that there is currently one 250 gallon diesel AST inside the dam. This AST is present for the emergency generator. Dean stated that there has never been a diesel spill associated with this AST. When questioned about the UST removal in 1992, Dean stated that he was working there when the three USTs were removed next to the maintenance building. At the time of removal, no evidence of contamination was apparent in the tank pit, and confirmation samples taken at the time came back clean. Two Construction Inspectors, Whitfield Lance and John Atkins, were interviewed to determine if any of the past or current construction contractors caused any concerns. Neither Whitfield nor John could recall any incidents from past or current contractors that would environmentally impact the proposed Phase 5 CWL.

Mapping was obtained from EDR for the project area and a review of reasonably ascertainable standard historical sources was performed as part of this investigation. The purpose of this historical record search is to determine the past uses of the project area. Aerial photographs, and USGS 7.5-minute historical topographic maps showing the project area were available and reviewed. Copies of these maps are included in Appendix B. The aerial photos and topographic maps did not indicate any past or present activities that would cause HTRW concerns within the project area.

Review of the records of regulatory agencies listing recognized environmental conditions were obtained for the project area from EDR. The target property was found in the following databases:

- RCRA-CESQG – Resource Conservation and Recovery Act Conditionally Exempt Small Quantity Generator
- FINDS - Facility Index System
- ECHO – EPA Enforcement and Compliance History Online
- NY MANIFEST

- WV UST

The first three databases indicate that the Bluestone Dam is listed under these programs; there is no present violations, or non-compliance under these programs. Bluestone Dam is listed under the NY Manifest program for disposing of lead contaminated paint removed from the structure to a NY hazardous waste landfill in 1996. The WV UST indicates that at one time, Bluestone Dam had three underground storage tanks at its facilities. These tanks were removed and the site closed out in 1992. No mapped sites were found within the search radius around the target property that would be an environmental concern. Due to poor or inadequate address information, two sites could not be plotted by EDR. Unplottable sites were reported in the WV NPDES, FINDS, and ECHO databases. Both are listed as BLUESTONE DAM – DAM SAFETY ASSURANCE. The WV NPDES is a water discharge permit required by the Phase 3 Contractor during construction. The FINDS and ECHO are listings for the Contractors during the Dam Safety Assurance construction.

2.1.2 Recommendation for Bluestone Dam CWL Area

Based on the investigative findings and the planned activities for this DSMS, there are no environmental concerns that would impact construction activities in the proposed CWL. It is recommended that current Phase 3 and Phase 4 construction activities be monitored for any incidents that might environmentally impact future construction activities on the USACE project.

If the design plans undergo further changes to include any additional areas for Phase 5 construction or mitigation, then those properties will have to be evaluated for any HTRW concerns.

3. REFERENCES

[ASTM E 1527-15, Standard Practices for Environmental Site Assessments: Phase I Environmental Site Assessment Process.](#)

[ASTM E 1528-14, Standard Practices for Environmental Site Assessments: Transaction Screening Process.](#)

[EM 385-1-1, Safety and Health Requirements Manual](#)

[ER 1165-2-132, Hazardous, Toxic, and Radioactive Waste \(HTRW\) Guidance for Civil Works Projects.](#)

APPENDIX A
PROJECT MAPPING

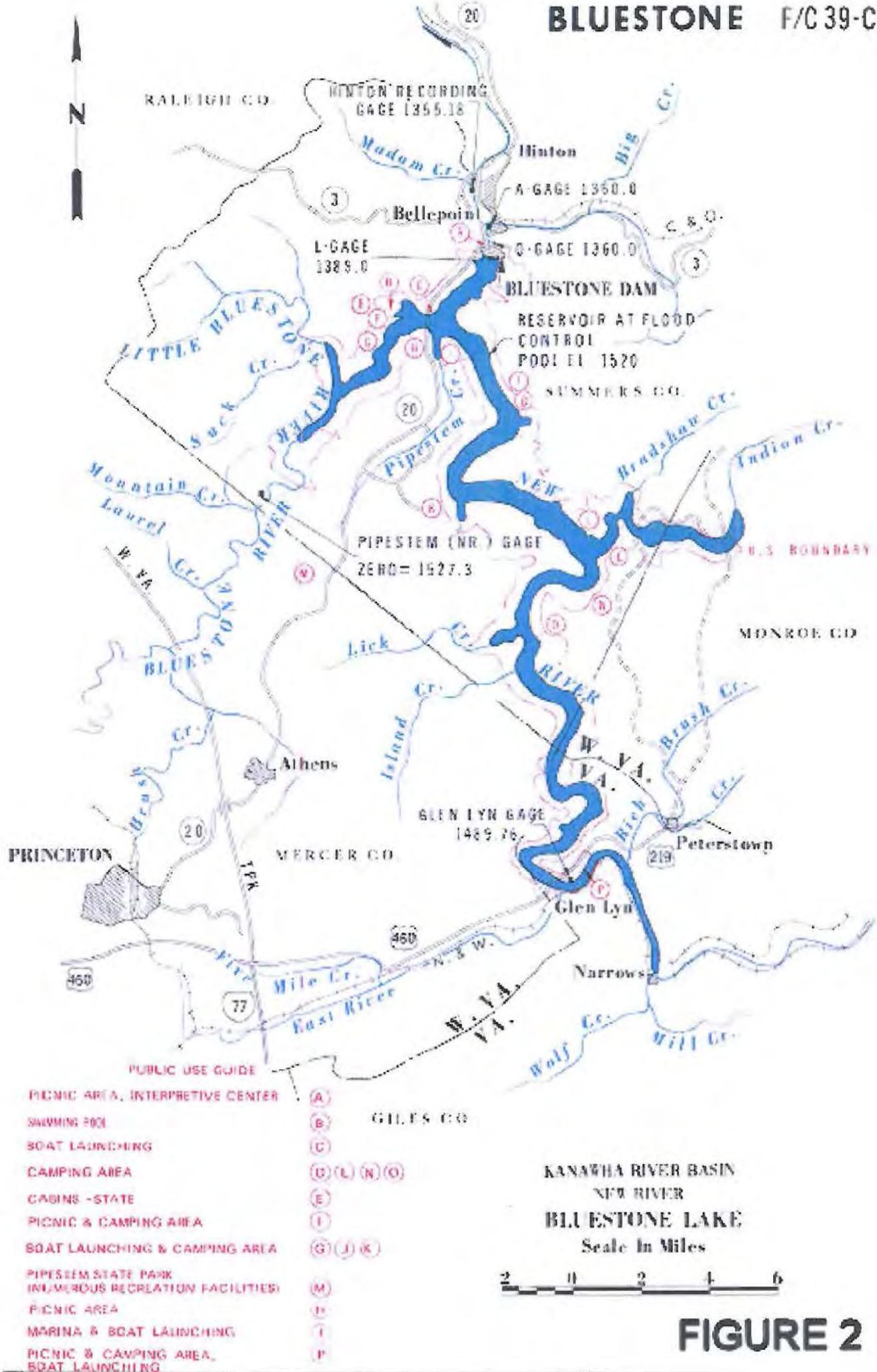


FIGURE 2

BLUESTONE DAM DSMS PHASE 5 CWL

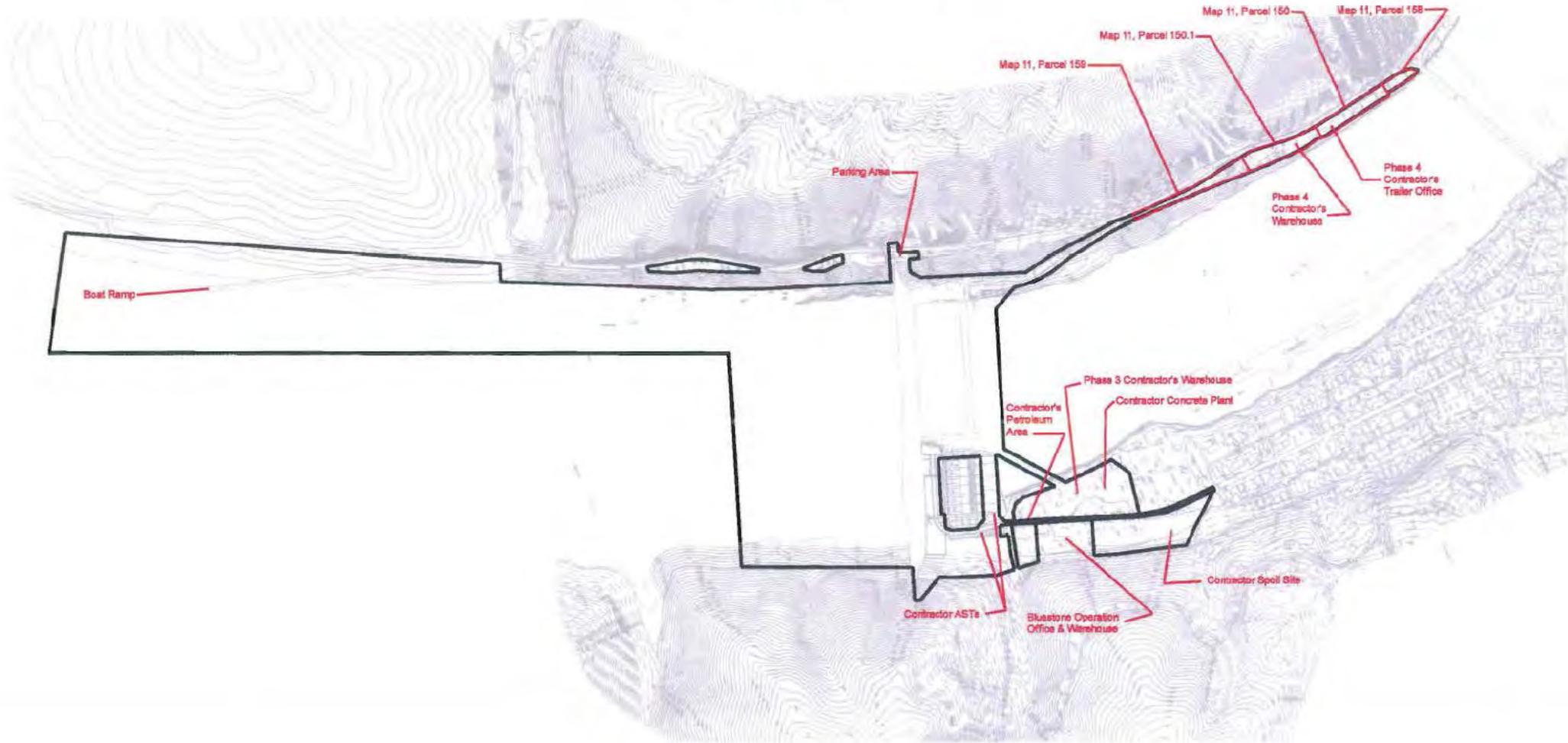
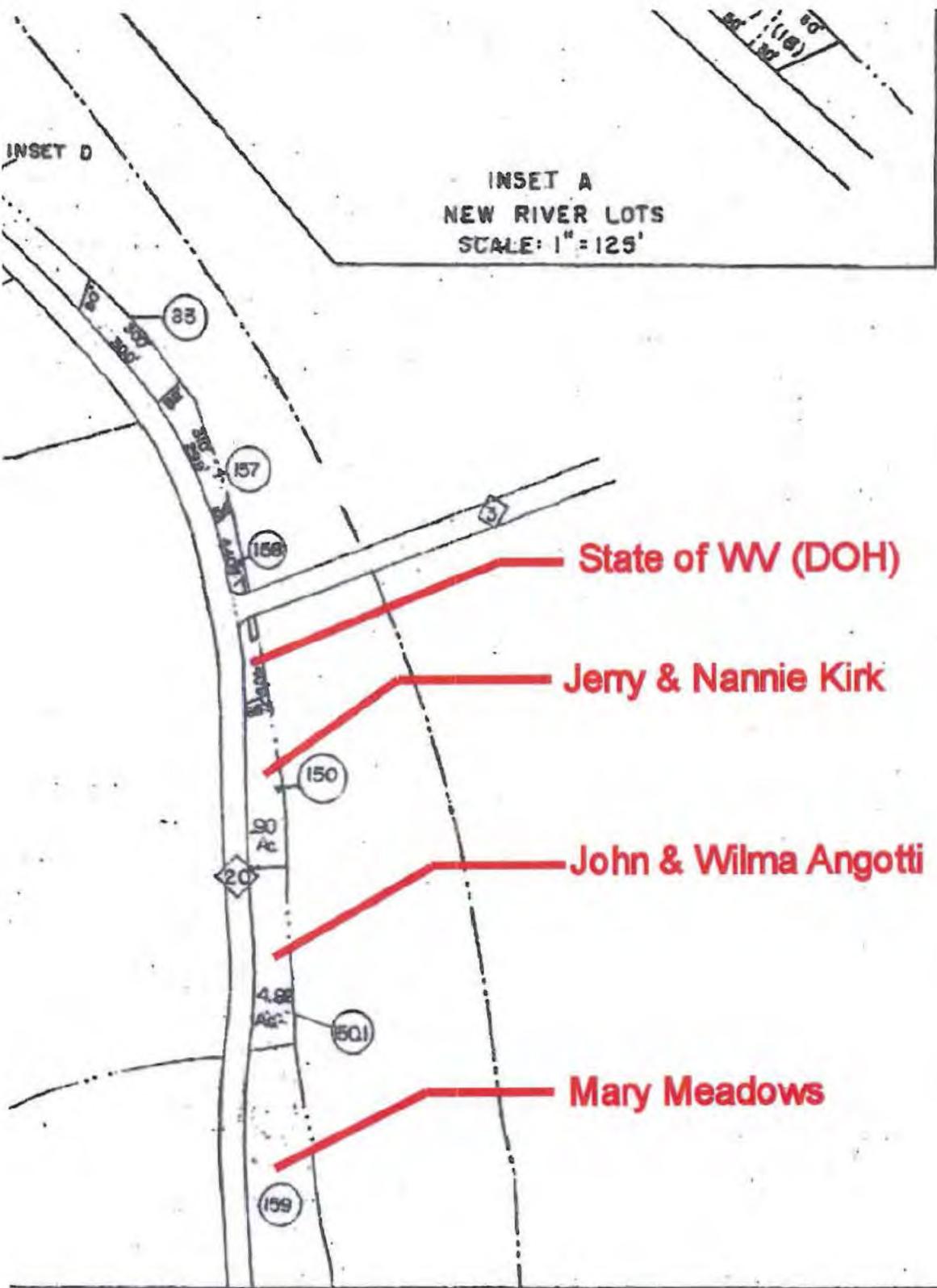


FIGURE 3



Map 11

Figure 4
SUMMERS COUNTY ~ WEST VIRGINIA

***APPENDIX B
HISTORIC TOPOGRAPHIC MAPS
AND AERIAL PHOTOS***



Bluestone Dam
701 Miller Ave
Hinton, WV 25951

Inquiry Number: 4614459.7
May 10, 2016

EDR Historical Topo Map Report

with QuadMatch™



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

Site Name:

Client Name:



EDR Inquiry #

Contact:

Search Results:

Coordinates:

P.O.#

Latitude:

Project:

Longitude:

UTM Zone:

UTM X Meters:

UTM Y Meters:

Elevation:

Maps Provided:

2014
1998
1976
1968
1914
1912
1892
1887

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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2014 Source Sheets



Talcott
2014
7.5-minute, 24000



Pipestem
2014
7.5-minute, 24000



Forest Hill
2014
7.5-minute, 24000



Hinton
2014
7.5-minute, 24000

1998 Source Sheets



Pipestem
1998
7.5-minute, 24000
Photo Inspected 1998
Aerial Photo Revised 1967



Hinton
1998
7.5-minute, 24000
Photo Inspected 1998
Aerial Photo Revised 1976

1976 Source Sheets



Hinton
1976
7.5-minute, 24000
Photo Revised 1976
Aerial Photo Revised 1967



Pipestem
1976
7.5-minute, 24000
Photo Inspected 1976
Aerial Photo Revised 1967



Forest Hill
1976
7.5-minute, 24000
Photo Inspected 1976
Aerial Photo Revised 1967

1968 Source Sheets



Forest Hill
1968
7.5-minute, 24000
Aerial Photo Revised 1967



Talcott
1968
7.5-minute, 24000
Aerial Photo Revised 1967



Hinton
1968
7.5-minute, 24000
Aerial Photo Revised 1967

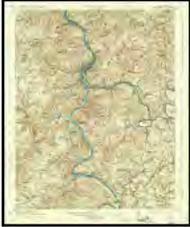


Pipestem
1968
7.5-minute, 24000
Aerial Photo Revised 1967

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1914 Source Sheets



Big Bend
1914
15-minute, 62500

1912 Source Sheets



Big Bend
1912
15-minute, 62500

1892 Source Sheets



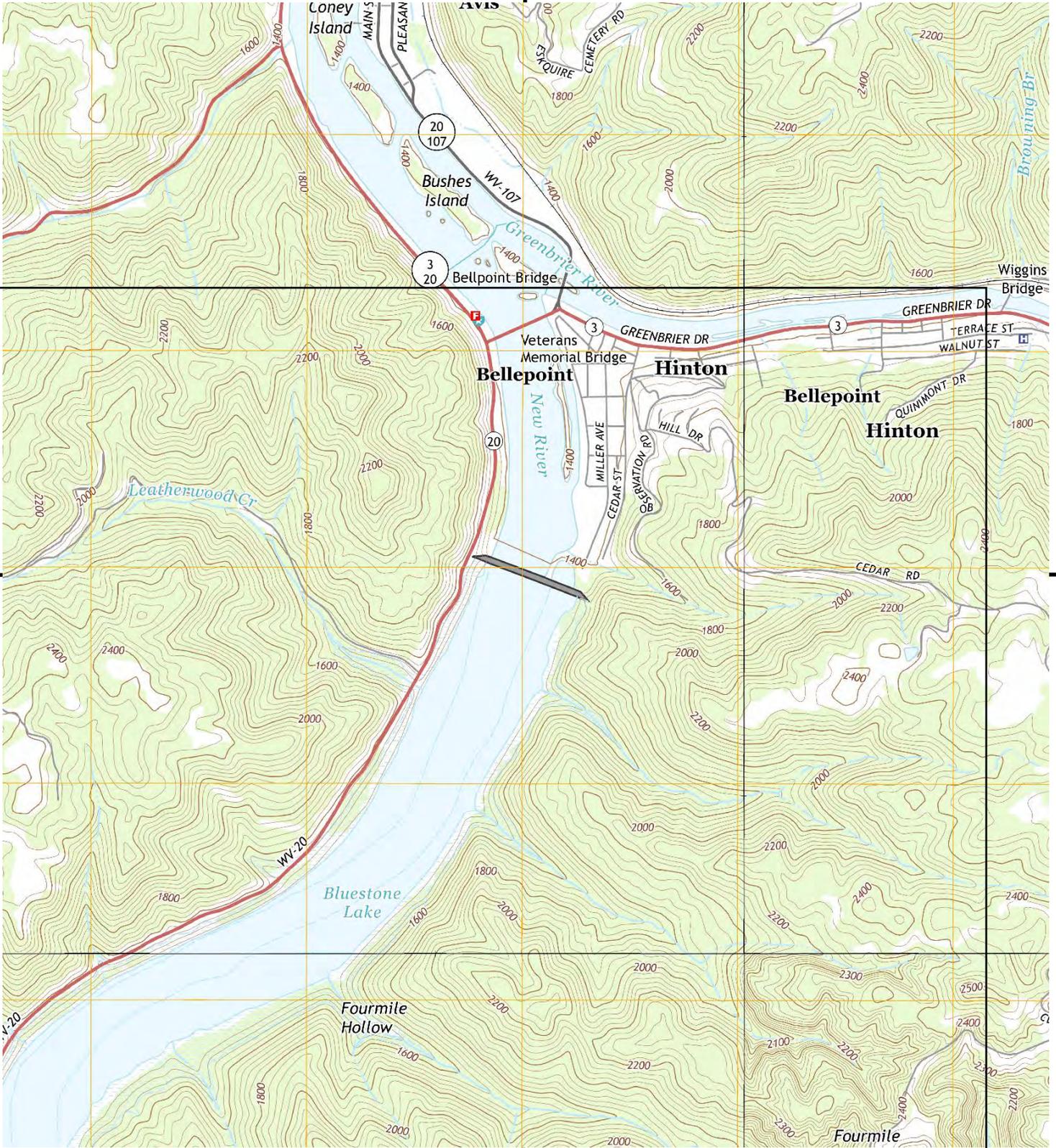
Hinton
1892
30-minute, 125000

1887 Source Sheets

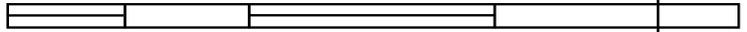


Hinton
1887
30-minute, 125000

Historical Topo Map



This report includes information from the following map sheet(s).



NW	N	NE
TP, Hinton,		
NE, Talcott		
SE, Fore		
SW, Pipest		
SW	S	SE
4614459		

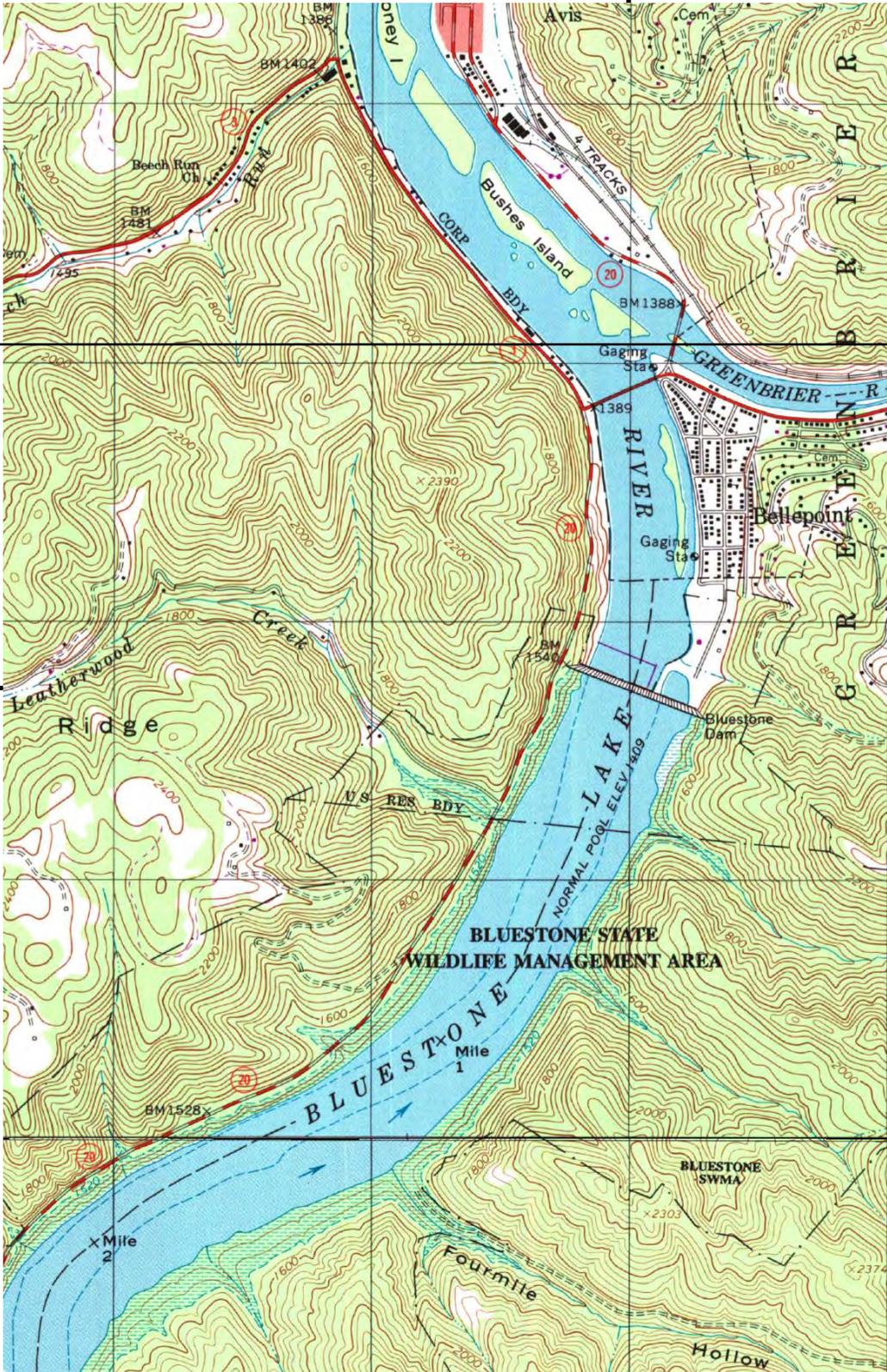
2014

of Engineers

SITE NAME:
ADDRESS:
CLIENT:



Historical Topo Map



This report includes information from the following map sheet(s).

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TP, Hinton,
SW, Pipest
W

NW N NE

SW S SE

4614459

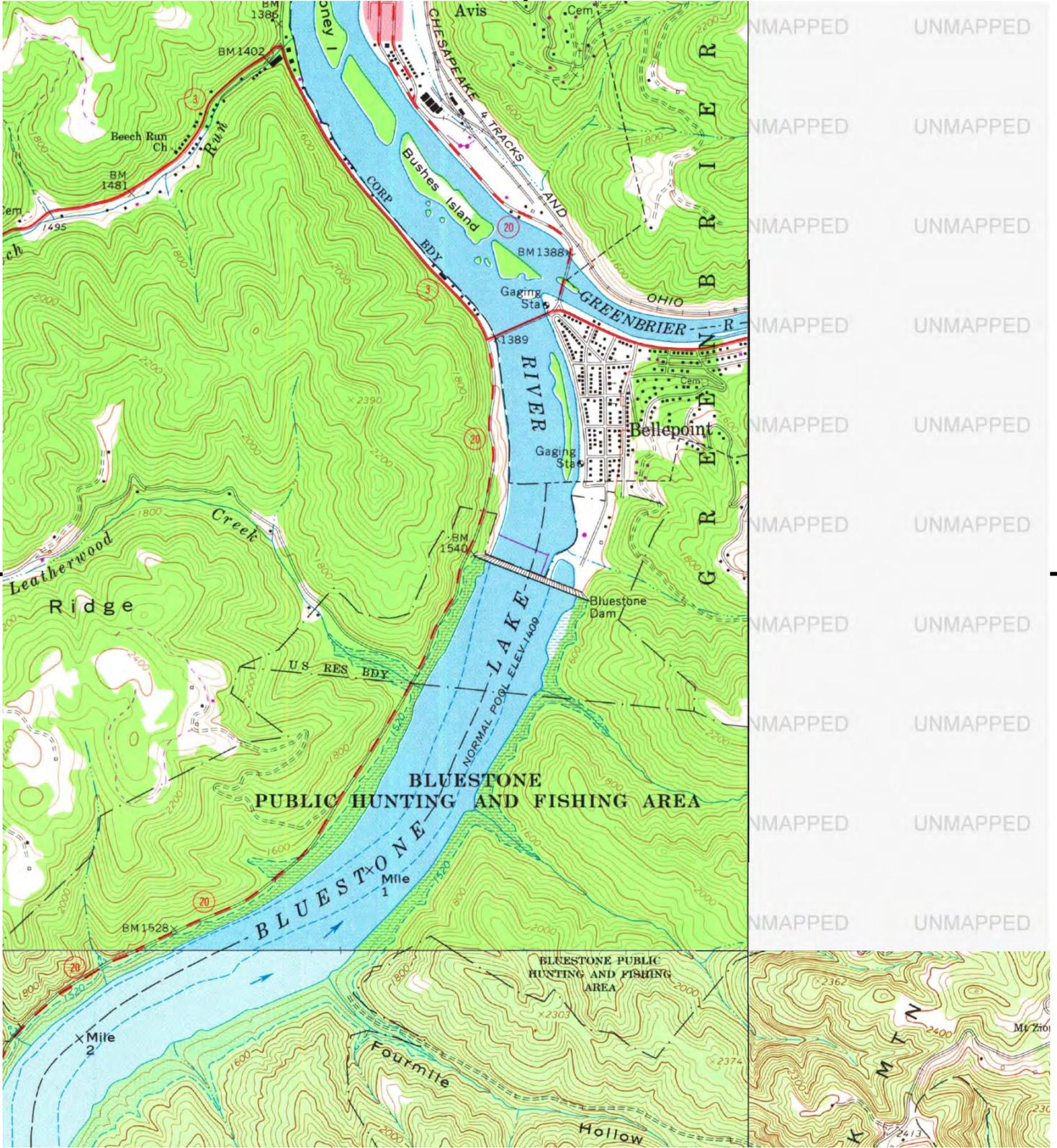
1998

Engineers of Engineers

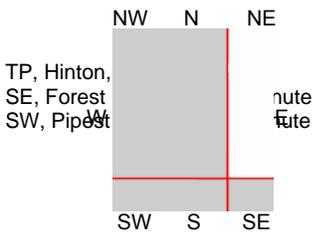
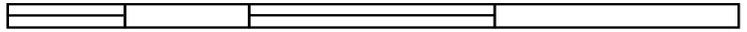
SITE NAME:
ADDRESS:
CLIENT:



Historical Topo Map

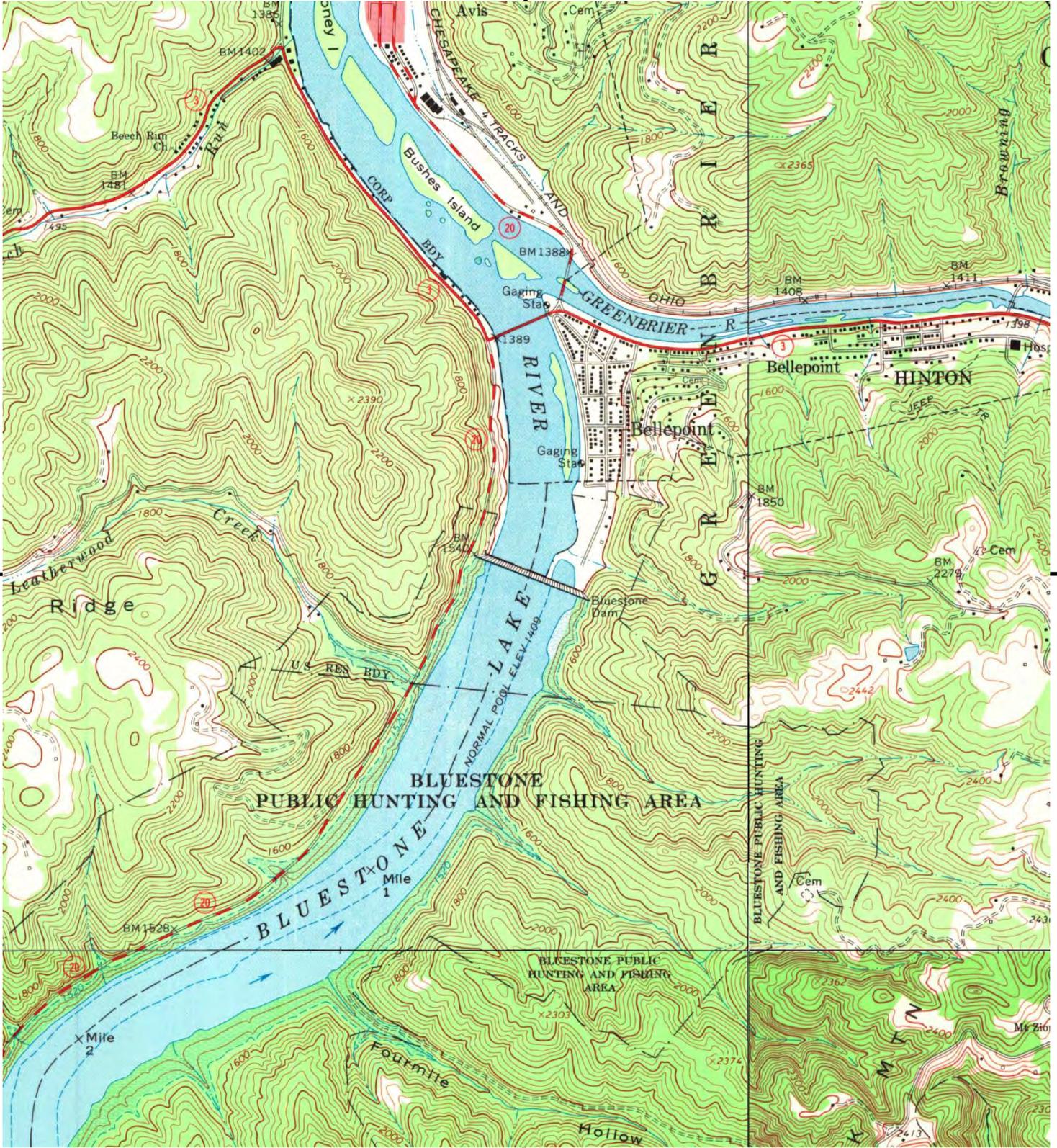


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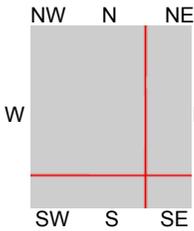
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ADDRESS:
CLIENT:





This report includes information from the following map sheet(s).

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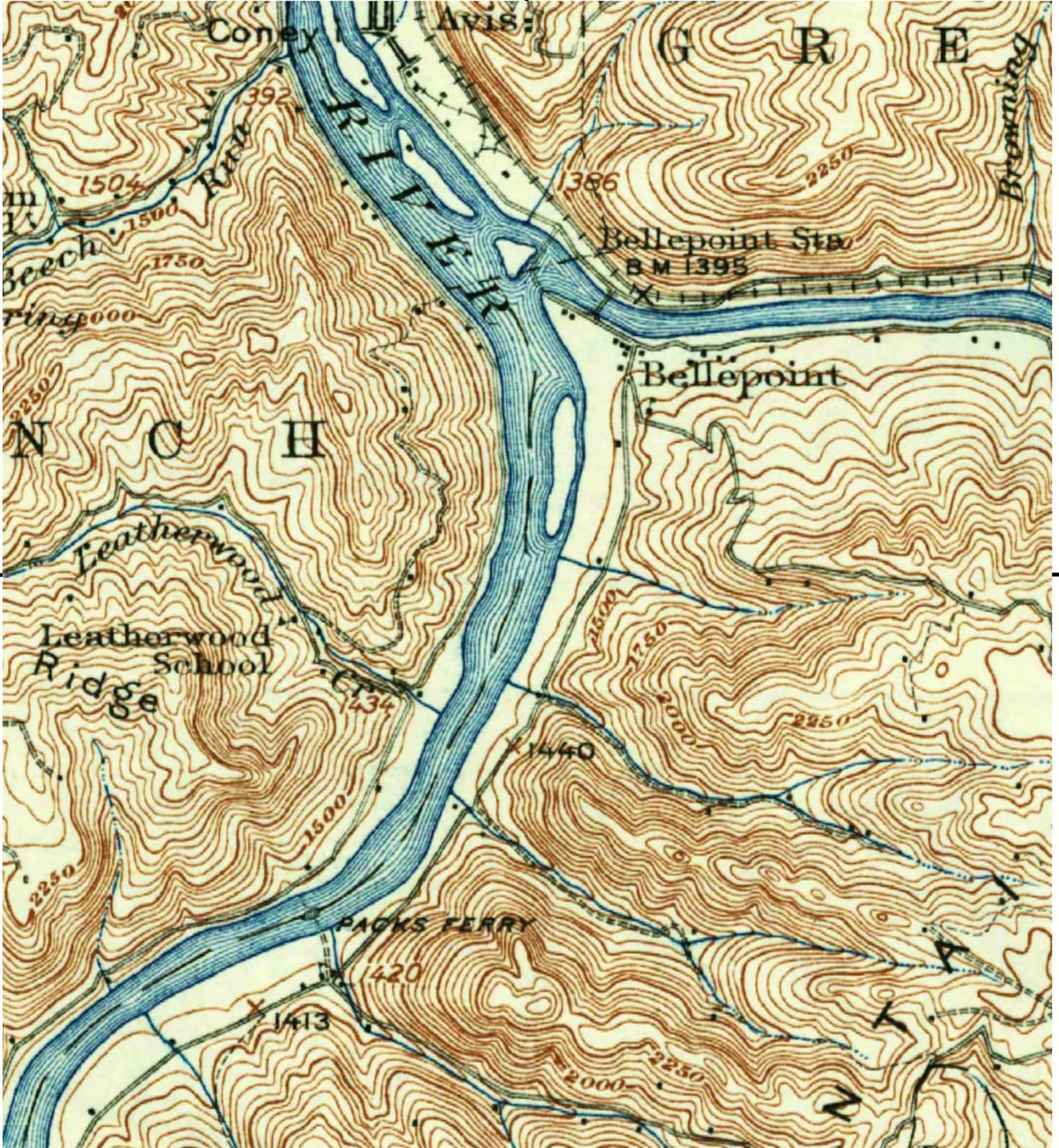


- TP, Hinton, 1968, 7.5-minute
- NE, Talcott, 1968, 7.5-minute
- SE, Forest Hill, 1968, 7.5-minute
- SW, Pipestem, 1968, 7.5-minute

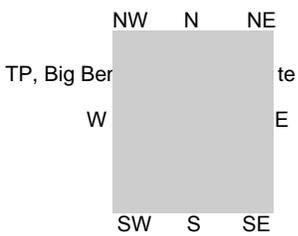
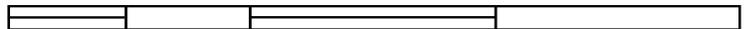
SITE NAME:
ADDRESS:

CLIENT:



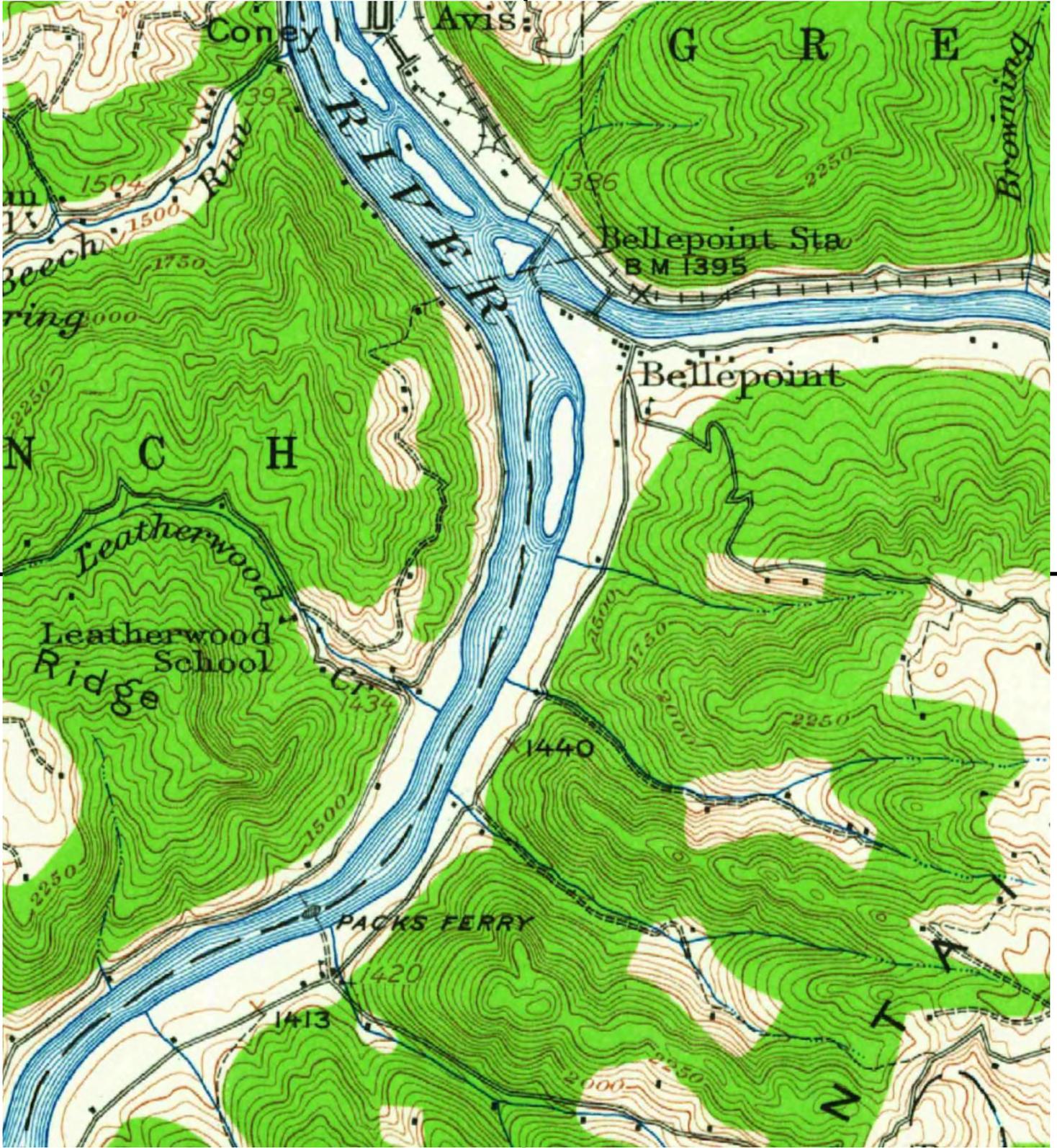


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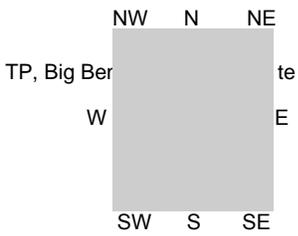


SITE NAME:
ADDRESS:
CLIENT:



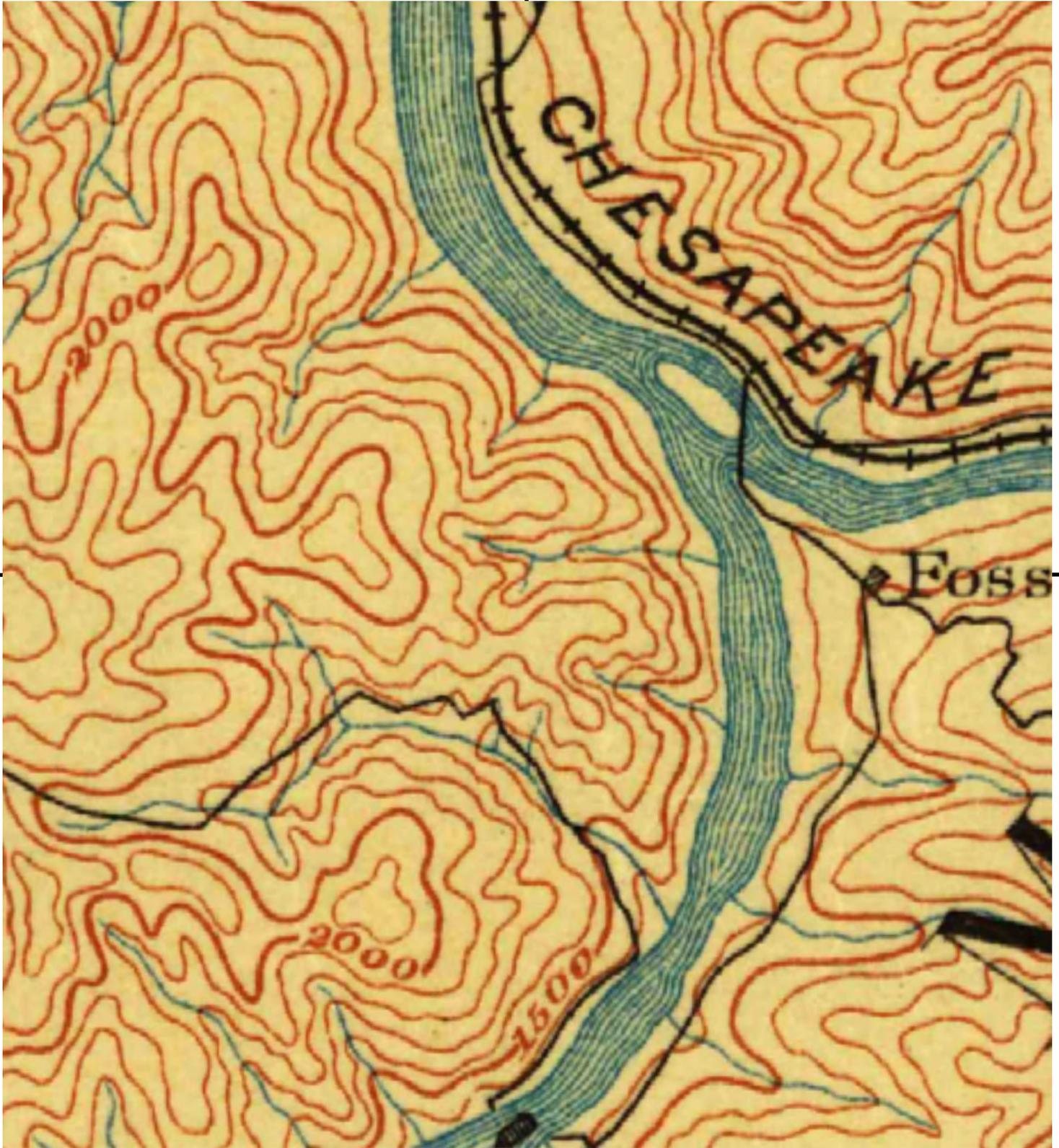


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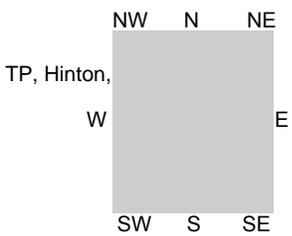
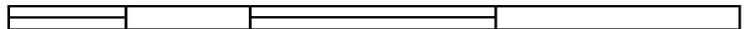


SITE NAME:
ADDRESS:
CLIENT:



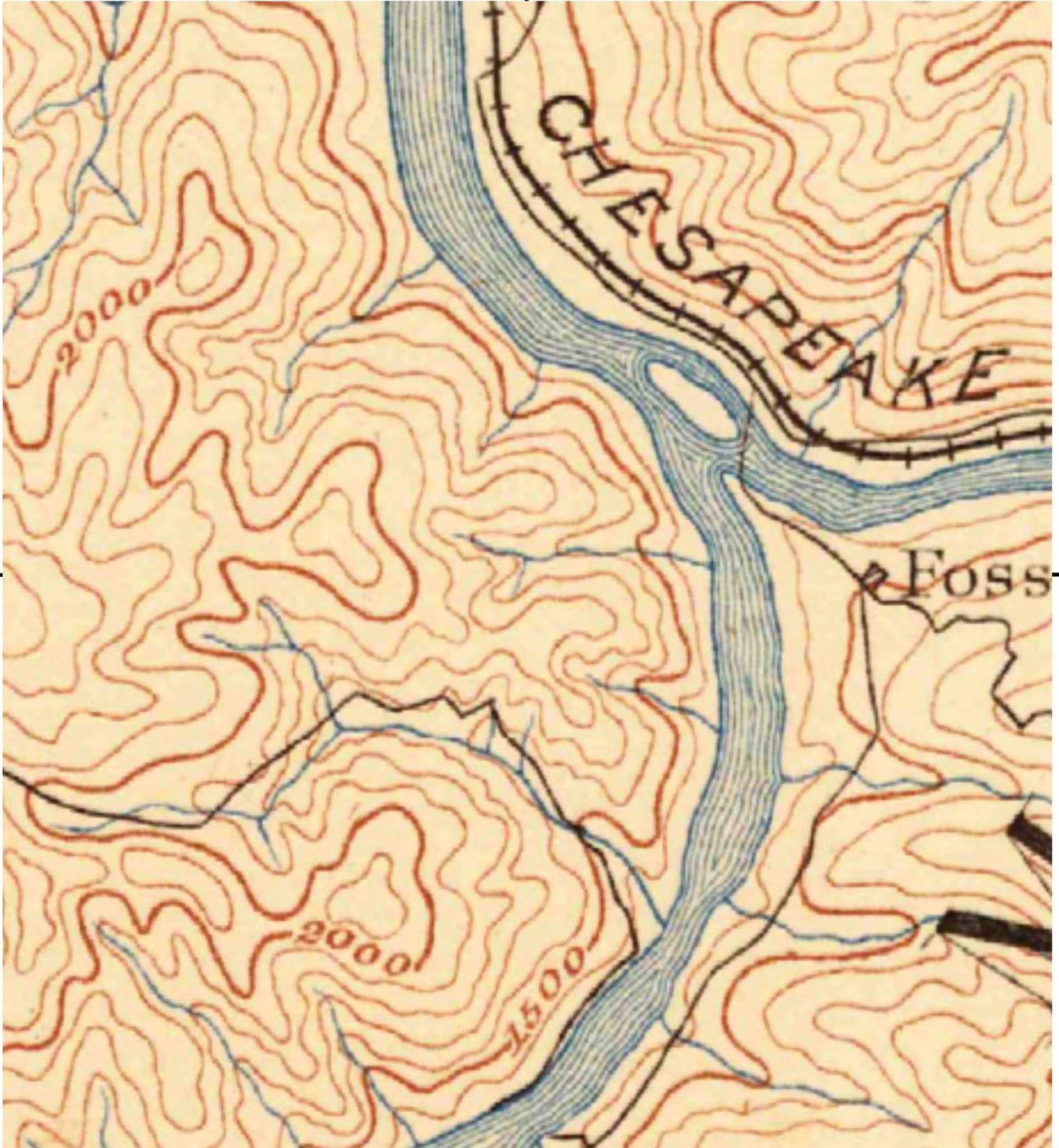


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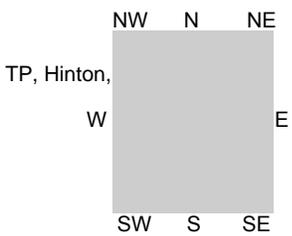
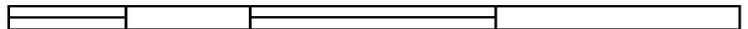


SITE NAME:
ADDRESS:
CLIENT:





This report includes information from the following map sheet(s).



SITE NAME:
ADDRESS:
CLIENT:





Bluestone Dam
701 Miller Ave
Hinton, WV 25951

Inquiry Number: 4614459.6

May 10, 2016

The EDR Aerial Photo Decade Package



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Site Name:

Client Name:



EDR Inquiry #

Contact:

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
2011	1"=500'	Flight Year: 2011	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2007	1"=500'	Flight Year: 2007	USDA/NAIP
1996	1"=500'	Acquisition Date: April, 03 1996	USGS/DOQQ
1990	1"=500'	Flight Date: October, 16 1990	USGS
1976	1"=1000'	Flight Date: April, 09 1976	USGS
1967	1"=750'	Flight Date: April, 02 1967	USGS
1960	1"=500'	Flight Date: November, 08 1960	USGS

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INQUIRY #: 4614459.6

YEAR: 2011

— = 500'





INQUIRY #: 4614459.6

YEAR: 2009

— = 500'





INQUIRY #: 4614459.6

YEAR: 2007

— = 500'





INQUIRY #: 4614459.6

YEAR: 1996

— = 500'





INQUIRY #: 4614459.6

YEAR: 1990

— = 500'





INQUIRY #: 4614459.6

YEAR: 1976

— = 1000'





INQUIRY #: 4614459.6

YEAR: 1967

— = 750'





INQUIRY #: _____

YEAR: _____



***APPENDIX C
RECORDS OF FEDERAL AND
STATE REGULATORY AGENCIES***

Bluestone Dam

701 Miller Ave
Hinton, WV 25951

Inquiry Number: 4614459.4s
May 10, 2016

The EDR Radius Map™ Report with GeoCheck®



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting Source Map	A-7
Physical Setting Source Map Findings	A-8
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
 Please contact EDR at 1-800-352-0050
 with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

701 MILLER AVE
HINTON, WV 25951

COORDINATES

Latitude (North): 37.6407690 - 37° 38' 26.76"
Longitude (West): 80.8864750 - 80° 53' 11.31"
Universal Transverse Mercator: Zone 17
UTM X (Meters): 510015.9
UTM Y (Meters): 4165760.0
Elevation: 1362 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	6008643 HINTON, WV
Version Date:	2014
Northeast Map:	6008663 TALCOTT, WV
Version Date:	2014
Southeast Map:	6008633 FOREST HILL, WV
Version Date:	2014
Southwest Map:	6008655 PIPESTEM, WV
Version Date:	2014

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20110823, 20111005
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
 701 MILLER AVE
 HINTON, WV 25951

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	US CORPS OF ENGINEER	701 MILLER AVE	RCRA-CESQG, FINDS, NY MANIFEST, ECHO		TP
A2	BLUESTONE LAKE	701 MILLER AVE	WV UST		TP
Reg	BLUESTONE LAKE		DOD	Same	1 ft.

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

<u>Site</u>	<u>Database(s)</u>	<u>EPA ID</u>
US CORPS OF ENGINEER 701 MILLER AVE HINTON, WV 25951	RCRA-CESQG EPA ID:: WV1960010147 FINDS Registry ID:: 110005551321 NY MANIFEST EPA ID: WV1960010147 ECHO	WV1960010147
BLUESTONE LAKE 701 MILLER AVE HINTON, WV 25951	WV UST Tank ID: D1 Tank ID: D2 Tank ID: D3 Facility ID: 4500716 Tank Status: P Date Closed: 01/30/1992 Closure Status: Tank removed from ground	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List
Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing
SEMS..... Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

EXECUTIVE SUMMARY

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators

RCRA-SQG..... RCRA - Small Quantity Generators

Federal institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System

US ENG CONTROLS..... Engineering Controls Sites List

US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent CERCLIS

WV SHWS..... This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

State and tribal landfill and/or solid waste disposal site lists

WV SWF/LF..... List of M.S.W. Landfills/Transfer Station Listing

WV LCP..... Landfill Closure Program

State and tribal leaking storage tank lists

WV LUST..... Leaking Underground Storage Tanks

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing

WV AST..... Aboveground Storage Tanks

INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

WV INST CONTROL..... Sites with Institutional Controls

State and tribal voluntary cleanup sites

WV VCP..... Voluntary Remediation Sites

INDIAN VCP..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

WV BROWNFIELDS..... Brownfields Sites Listing

EXECUTIVE SUMMARY

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

ODI..... Open Dump Inventory

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL..... Delisted National Clandestine Laboratory Register

WV CDL..... Drug Lab Site Locations

US CDL..... National Clandestine Laboratory Register

Local Land Records

LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System

WV SPILLS..... Spills Listing

Other Ascertainable Records

RCRA NonGen / NLR..... RCRA - Non Generators / No Longer Regulated

FUDS..... Formerly Used Defense Sites

SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing

US FIN ASSUR..... Financial Assurance Information

EPA WATCH LIST..... EPA WATCH LIST

2020 COR ACTION..... 2020 Corrective Action Program List

TSCA..... Toxic Substances Control Act

TRIS..... Toxic Chemical Release Inventory System

SSTS..... Section 7 Tracking Systems

ROD..... Records Of Decision

RMP..... Risk Management Plans

RAATS..... RCRA Administrative Action Tracking System

PRP..... Potentially Responsible Parties

PADS..... PCB Activity Database System

ICIS..... Integrated Compliance Information System

FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

MLTS..... Material Licensing Tracking System

COAL ASH DOE..... Steam-Electric Plant Operation Data

COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List

PCB TRANSFORMER..... PCB Transformer Registration Database

RADINFO..... Radiation Information Database

HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing

DOT OPS..... Incident and Accident Data

EXECUTIVE SUMMARY

CONSENT.....	Superfund (CERCLA) Consent Decrees
INDIAN RESERV.....	Indian Reservations
FUSRAP.....	Formerly Utilized Sites Remedial Action Program
UMTRA.....	Uranium Mill Tailings Sites
LEAD SMELTERS.....	Lead Smelter Sites
US AIRS.....	Aerometric Information Retrieval System Facility Subsystem
US MINES.....	Mines Master Index File
UXO.....	Unexploded Ordnance Sites
DOCKET HWC.....	Hazardous Waste Compliance Docket Listing
WV AIRS.....	Permitted Facility and Emissions Listing
WV COAL ASH.....	Coal Ash Landfills
WV DRYCLEANERS.....	Listing of Drycleaner Locations
WV Financial Assurance.....	Financial Assurance Information Listing
WV NPDES.....	Wastewater Discharge Permits Listing
WV UIC.....	Underground Injection Wells
FUELS PROGRAM.....	EPA Fuels Program Registered Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP.....	EDR Proprietary Manufactured Gas Plants
EDR Hist Auto.....	EDR Exclusive Historic Gas Stations
EDR Hist Cleaner.....	EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

WV RGA LF.....	Recovered Government Archive Solid Waste Facilities List
WV RGA LUST.....	Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

DOD: Consists of federally owned or administered lands, administered by the Department of

EXECUTIVE SUMMARY

Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

A review of the DOD list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 DOD site within approximately 1 mile of the target property.

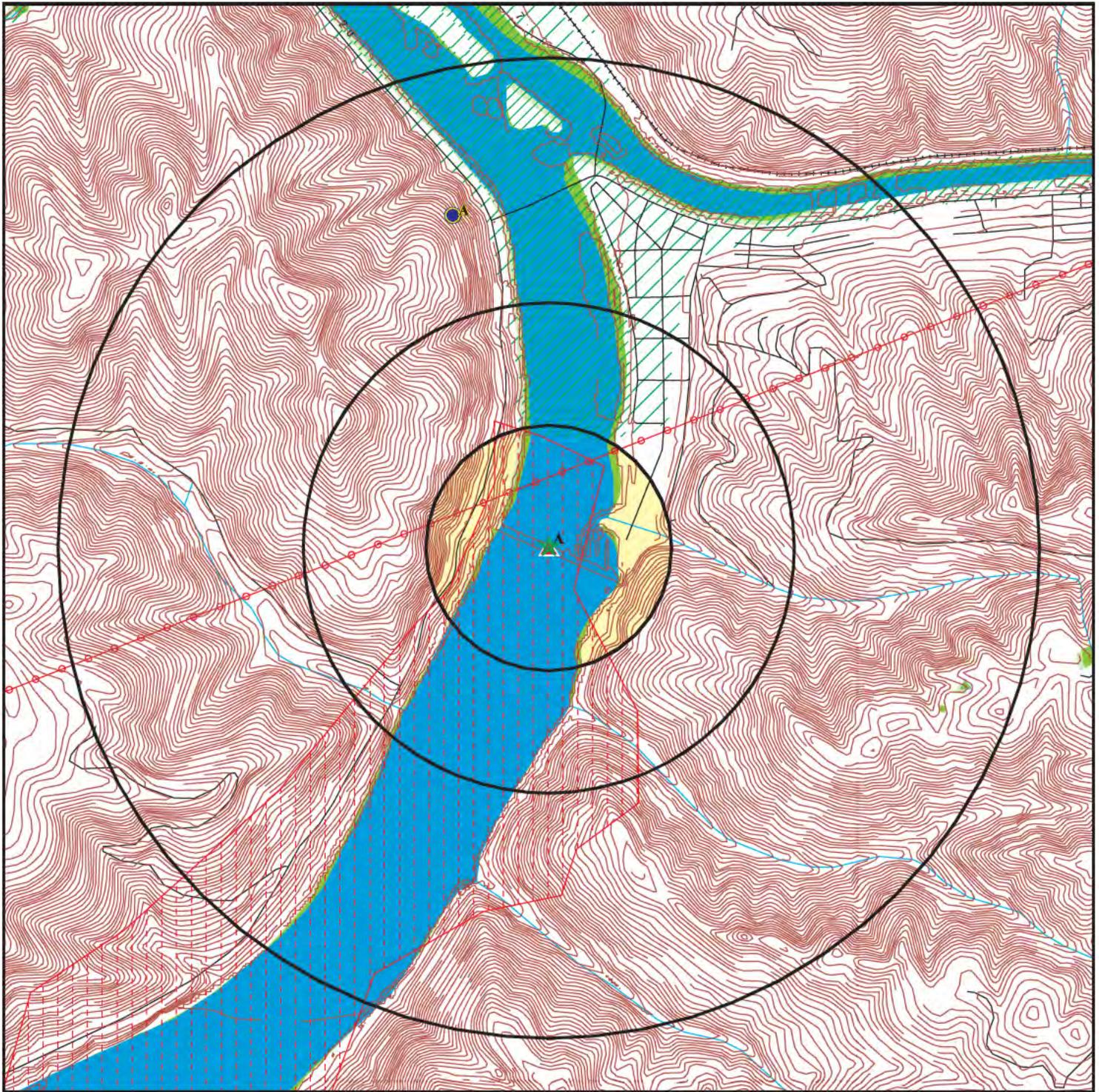
<u>Equal/Higher Elevation</u>	<u>Address</u>	<u>Direction / Distance</u>	<u>Map ID</u>	<u>Page</u>
BLUESTONE LAKE		0 - 1/8 (0.000 mi.)	0	13

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 2 records.

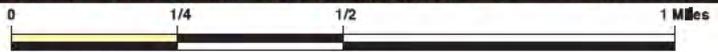
<u>Site Name</u>	<u>Database(s)</u>
BLUESTONE DAM - DAM SAFETY ASSURAN	WV NPDES
BLUESTONE DAM SAFETY ASSURANCE	FINDS, ECHO

OVERVIEW MAP - 4614459.4S



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

- Indian Reservations BIA
- Power transmission lines
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- National Wetland Inventory
- State Wetlands

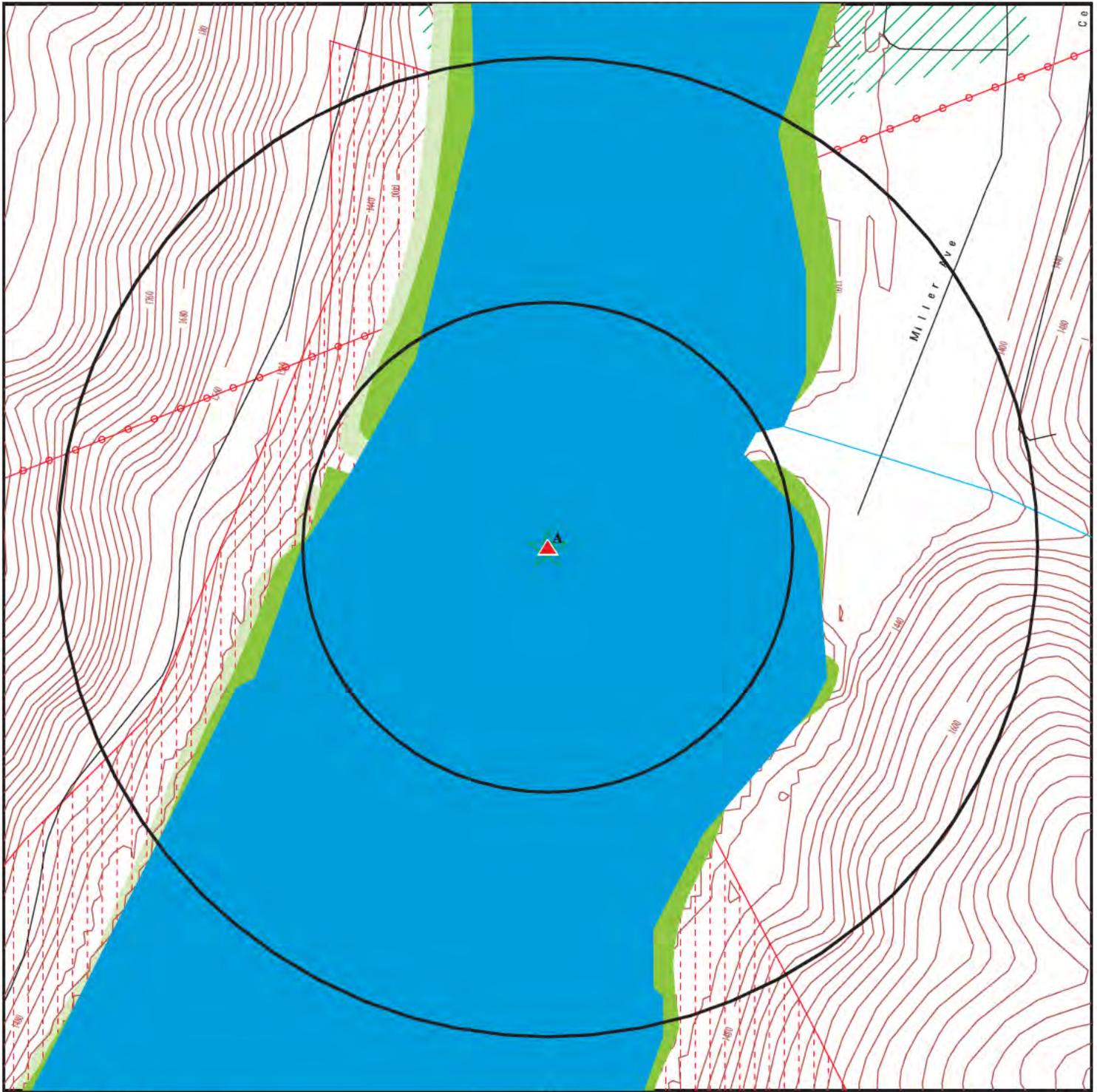


This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Bluestone Dam
 ADDRESS: 701 Miller Ave
 Hinton WV 25951
 LAT/LONG: 37.640769 / 80.886475

CLIENT: U.S. Army Corps of Engineers
 CONTACT: Dan Stark
 INQUIRY #: 4614459.4s
 DATE: May 10, 2016 12:57 pm

DETAIL MAP - 4614459.4S



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- 🚧 National Priority List Sites
- 🏠 Dept. Defense Sites

- 🏠 Indian Reservations BIA
- ⚡ Power transmission lines
- 🌊 100-year flood zone
- 🌊 500-year flood zone
- 🌿 National Wetland Inventory
- 🌿 State Wetlands

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

<p>SITE NAME: Bluestone Dam ADDRESS: 701 Miller Ave Hinton WV 25951 LAT/LONG: 37.640769 / 80.886475</p>	<p>CLIENT: U.S. Army Corps of Engineers CONTACT: Dan Stark INQUIRY #: 4614459.4s DATE: May 10, 2016 12:57 pm</p>
---	---

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
<i>Federal CERCLIS NFRAP site list</i>								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250	1	0	0	NR	NR	NR	1
<i>Federal institutional controls / engineering controls registries</i>								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	TP		NR	NR	NR	NR	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
WV SHWS	N/A		N/A	N/A	N/A	N/A	N/A	N/A
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
WV SWF/LF	0.500		0	0	0	NR	NR	0
WV LCP	0.500		0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
WV LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
<i>State and tribal registered storage tank lists</i>								
FEMA UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
WV UST	0.250	1	0	0	NR	NR	NR	1
WV AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
WV INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
WV VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
WV BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
WV CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
WV SPILLS	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		1	0	0	0	NR	1
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

<u>Database</u>	<u>Search Distance (Miles)</u>	<u>Target Property</u>	<u>< 1/8</u>	<u>1/8 - 1/4</u>	<u>1/4 - 1/2</u>	<u>1/2 - 1</u>	<u>> 1</u>	<u>Total Plotted</u>
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NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

N/A = This State does not maintain a SHWS list. See the Federal CERCLIS list.

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

A1
Target
Property

US CORPS OF ENGINEERS - BLUESTONE LAKE
701 MILLER AVE
HINTON, WV 25951

RCRA-CESQG
FINDS
NY MANIFEST
ECHO

1000448591
WV1960010147

Site 1 of 2 in cluster A

Actual:
1362 ft.

RCRA-CESQG:

Date form received by agency: 03/20/2015
Facility name: Not reported
Facility address: 701 MILLER AVE
HINTON, WV 25951
EPA ID: WV1960010147
Mailing address: 502 EIGHTH ST ATTN: OR-E
HUNTINGTON, WV 25701
Contact: DEAN BONIFACIO
Contact address: 701 MILLER AVE
HINTON, WV 25951
Contact country: US
Contact telephone: 304-399-5140
Contact email: LLOYD.D.BONIFACIO@USACE.ARMY.MIL
EPA Region: Not reported
Land type: Federal
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name: CORPS OF ENGINEERS
Owner/operator address: Not reported
WV
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Federal
Owner/Operator Type: Owner
Owner/Op start date: 08/01/1990
Owner/Op end date: Not reported

Owner/operator name: CORPS OF ENGINEERS
Owner/operator address: Not reported
WV
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Federal
Owner/Operator Type: Operator
Owner/Op start date: 08/01/1990
Owner/Op end date: Not reported

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

US CORPS OF ENGINEERS - BLUESTONE LAKE (Continued)

1000448591

Handler Activities Summary:

U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:

Date form received by agency: 11/01/2006
Site name: US CORPS OF ENGINEERS
Classification: Conditionally Exempt Small Quantity Generator

Date form received by agency: 05/13/2005
Site name: US CORPS OF ENGINEERS
Classification: Conditionally Exempt Small Quantity Generator

Date form received by agency: 10/23/2003
Site name: US CORPS OF ENGINEERS
Classification: Not a generator, verified

Date form received by agency: 08/17/1990
Site name: US CORPS OF ENGINEERS
Classification: Small Quantity Generator

Violation Status: No violations found

Evaluation Action Summary:

Evaluation date: 06/04/2003
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 10/16/1995
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/26/1992
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/26/1991

Map ID
Direction
Distance
Elevation



Site

Database(s)

EDR ID Number
EPA ID Number

US CORPS OF ENGINEERS - BLUESTONE LAKE (Continued)

1000448591

Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

FINDS:

Registry ID: 110005551321

Environmental Interest/Information System

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

NY MANIFEST:

EPA ID: WV1960010147
Country: USA
Location Address 1: 701 MILLER AVE
Location Address 2: Not reported
Location City: HINTON
Location State: WV
Location Zip Code: 25951
Location Zip Code 4: Not reported

Mailing Info:

Name: US ARMY CORPS OF ENGINEERS
Contact: MICHAEL MAYNARD
Address: 701 MILLER AVE
City/State/Zip: HINTON, WV 25951
Country: USA
Phone: 304-529-5191

Manifest:

Document ID: NYB8751006
Manifest Status: Completed after the designated time period for a TSDF to get a copy to the DEC
Trans1 State ID: 80358VNY
Trans2 State ID: Not reported
Generator Ship Date: 11/20/1996
Trans1 Recv Date: 11/20/1996
Trans2 Recv Date: / /
TSD Site Recv Date: 11/21/1996
Part A Recv Date: / /
Part B Recv Date: 12/18/1996
Generator EPA ID: WV1960010147
Trans1 EPA ID: NYD982792814
Trans2 EPA ID: Not reported
TSDF ID: NYD049836679
Waste Code: D008 - LEAD 5.0 MG/L TCLP
Quantity: 08400
Units: P - Pounds
Number of Containers: 012
Container Type: DM - Metal drums, barrels

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

US CORPS OF ENGINEERS - BLUESTONE LAKE (Continued)

1000448591

Handling Method: T Chemical, physical, or biological treatment.
Specific Gravity: 100
Waste Code: D008 - LEAD 5.0 MG/L TCLP
Quantity: 09100
Units: P - Pounds
Number of Containers: 013
Container Type: DM - Metal drums, barrels
Handling Method: L Landfill.
Specific Gravity: 100
Waste Code: D008 - LEAD 5.0 MG/L TCLP
Quantity: 01000
Units: P - Pounds
Number of Containers: 005
Container Type: CF - Fiber or plastic boxes, cartons
Handling Method: L Landfill.
Specific Gravity: 100
Waste Code: D008 - LEAD 5.0 MG/L TCLP
Quantity: 02800
Units: P - Pounds
Number of Containers: 004
Container Type: DM - Metal drums, barrels
Handling Method: T Chemical, physical, or biological treatment.
Specific Gravity: 100
Year: 1996

Document ID: NYB8193924
Manifest Status: Completed copy
Trans1 State ID: NY67267K
Trans2 State ID: Not reported
Generator Ship Date: 11/06/1996
Trans1 Recv Date: 11/06/1996
Trans2 Recv Date: / /
TSD Site Recv Date: 11/08/1996
Part A Recv Date: / /
Part B Recv Date: 11/27/1996
Generator EPA ID: WV1960010147
Trans1 EPA ID: NYD000688671
Trans2 EPA ID: Not reported
TSD ID: NYD049836679
Waste Code: D008 - LEAD 5.0 MG/L TCLP
Quantity: 07140
Units: P - Pounds
Number of Containers: 001
Container Type: CM - Metal boxes, cases, roll-offs
Handling Method: L Landfill.
Specific Gravity: 100
Year: 1996

Document ID: NYB7407432
Manifest Status: Completed copy
Trans1 State ID: TV40957
Trans2 State ID: Not reported
Generator Ship Date: 03/05/1996
Trans1 Recv Date: 03/05/1996
Trans2 Recv Date: / /

Map ID
Direction
Distance
Elevation



Site

Database(s)

EDR ID Number
EPA ID Number

US CORPS OF ENGINEERS - BLUESTONE LAKE (Continued)

1000448591

TSD Site Recv Date: 03/07/1996
Part A Recv Date: / /
Part B Recv Date: 03/18/1996
Generator EPA ID: WV1960010147
Trans1 EPA ID: PAD146714878
Trans2 EPA ID: Not reported
TSDF ID: NYD049836679
Waste Code: D008 - LEAD 5.0 MG/L TCLP
Quantity: 01500
Units: P - Pounds
Number of Containers: 003
Container Type: DM - Metal drums, barrels
Handling Method: T Chemical, physical, or biological treatment.
Specific Gravity: 100
Year: 1996

ECHO:

Envid: 1000448591
Registry ID: 110005551321
DFR URL: http://echo.epa.gov/detailed_facility_report?fid=110005551321

**A2
Target
Property**

**BLUESTONE LAKE
701 MILLER AVE
HINTON, WV 25951**

**WV UST U003771397
N/A**

Site 2 of 2 in cluster A

**Actual:
1362 ft.**

UST:

Facility ID: 4500716
Owner: US ARMY CORP OF ENGINEERS
Owner Address: 502 EIGHTH ST
Owner Address 2: Not reported
Owner City,St,Zip: HUNTINGTON, WV 25701
Owner Telephone: (304) 529-5388

Tank ID: D1
Tank Status: Permanently Out of Service
Tank Substance: Gasoline
Tank Capacity: 1000
Date Last Used: 09/01/1990
Date Closed: 01/30/1992
Closure Status: Tank removed from ground
Tank Material: Asphalt Coated or Bare Steel
Piping Material: Unprotected Steel
Overfill Installed: No
Installed Spill Protection: No
Cathodic Protection Method: No
Compartment: N
Latitude: Not reported
Longitude: Not reported

Tank ID: D2
Tank Status: Permanently Out of Service
Tank Substance: Diesel
Tank Capacity: 1000
Date Last Used: 09/01/1990

Map ID
Direction
Distance
Elevation

MAP FINDINGS

Site

Database(s)

EDR ID Number
EPA ID Number

BLUESTONE LAKE (Continued)

U003771397

Date Closed: 01/30/1992
Closure Status: Tank removed from ground
Tank Material: Asphalt Coated or Bare Steel
Piping Material: Unprotected Steel
Overfill Installed: No
Installed Spill Protection: No
Cathodic Protection Method: No
Compartment: N
Latitude: Not reported
Longitude: Not reported

Tank ID: D3
Tank Status: Permanently Out of Service
Tank Substance: Gasoline
Tank Capacity: 550
Date Last Used: 09/01/1990
Date Closed: 01/30/1992
Closure Status: Tank removed from ground
Tank Material: Asphalt Coated or Bare Steel
Piping Material: Unprotected Steel
Overfill Installed: No
Installed Spill Protection: No
Cathodic Protection Method: No
Compartment: N
Latitude: Not reported
Longitude: Not reported

**DOD
Region**

BLUESTONE LAKE

**DOD CUSA136329
N/A**

< 1/8
1 ft.

BLUESTONE LAKE (County), VA

DOD:
Feature 1: Army Corps of Engineers DOD
Feature 2: Not reported
Feature 3: Not reported
URL: Not reported
Name 1: Bluestone Lake
Name 2: Not reported
Name 3: Not reported
State: VA-WV
DOD Site: Yes
Tile name: WVSUMMERS

Count: 2 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HINTON	1014911814	BLUESTONE DAM SAFETY ASSURANCE	MILLER AVENUE	25951	FINDS, ECHO
HINTON	S117441731	BLUESTONE DAM - DAM SAFETY ASSURAN	MILLER AVENUE	25951	WV NPDES

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: N/A
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 04/18/2016
	Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: N/A
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 04/18/2016
	Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991	Source: EPA
Date Data Arrived at EDR: 02/02/1994	Telephone: 202-564-4267
Date Made Active in Reports: 03/30/1994	Last EDR Contact: 08/15/2011
Number of Days to Update: 56	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: N/A
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 04/18/2016
	Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 04/08/2015	Telephone: 703-603-8704
Date Made Active in Reports: 06/11/2015	Last EDR Contact: 04/08/2016
Number of Days to Update: 64	Next Scheduled EDR Contact: 07/18/2016
	Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: 800-424-9346
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 08/01/2016
	Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 03/07/2016	Source: EPA
Date Data Arrived at EDR: 04/05/2016	Telephone: 800-424-9346
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 04/05/2016
Number of Days to Update: 10	Next Scheduled EDR Contact: 08/01/2016
	Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/09/2015	Source: EPA
Date Data Arrived at EDR: 03/02/2016	Telephone: 800-424-9346
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 800-438-2474
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 800-438-2474
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 800-438-2474
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/02/2016	Telephone: 800-438-2474
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 03/30/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015	Source: Department of the Navy
Date Data Arrived at EDR: 05/29/2015	Telephone: 843-820-7326
Date Made Active in Reports: 06/11/2015	Last EDR Contact: 02/16/2016
Number of Days to Update: 13	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/10/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/11/2015	Telephone: 703-603-0695
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 02/29/2016
Number of Days to Update: 53	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/10/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/11/2015	Telephone: 703-603-0695
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 02/29/2016
Number of Days to Update: 53	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: Department of Environmental Protection
Telephone: 304-926-0455
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: N/A

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: List of M.S.W. Landfills/Transfer Station Listing

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 01/06/2016
Date Data Arrived at EDR: 01/12/2016
Date Made Active in Reports: 03/08/2016
Number of Days to Update: 56

Source: Division of Environmental Protection
Telephone: 304-926-0499
Last EDR Contact: 03/28/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Varies

LCP: Landfill Closure Program

The WV DEP's LCAP aids the owners/permittees of landfills that were required to cease operations because of certain statutory closure deadlines for non-composite lined facilities

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 03/18/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 28

Source: Department of Environmental Protection
Telephone: 304-926-0499
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Annually

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tanks

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 12/28/2015
Date Data Arrived at EDR: 03/03/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 43

Source: Division of Environmental Protection
Telephone: 304-926-0455
Last EDR Contact: 03/03/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/30/2015	Source: EPA Region 7
Date Data Arrived at EDR: 04/28/2015	Telephone: 913-551-7003
Date Made Active in Reports: 06/22/2015	Last EDR Contact: 04/29/2016
Number of Days to Update: 55	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/27/2015	Source: EPA Region 1
Date Data Arrived at EDR: 10/29/2015	Telephone: 617-918-1313
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 67	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 11/24/2015	Source: EPA Region 4
Date Data Arrived at EDR: 12/01/2015	Telephone: 404-562-8677
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/26/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Semi-Annually

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/13/2015	Source: EPA Region 8
Date Data Arrived at EDR: 10/23/2015	Telephone: 303-312-6271
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/27/2016
Number of Days to Update: 118	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/08/2015	Telephone: 415-972-3372
Date Made Active in Reports: 02/09/2015	Last EDR Contact: 04/27/2016
Number of Days to Update: 32	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 08/20/2015	Source: EPA Region 6
Date Data Arrived at EDR: 10/30/2015	Telephone: 214-665-6597
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 111	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/04/2015	Source: EPA, Region 5
Date Data Arrived at EDR: 11/13/2015	Telephone: 312-886-7439
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/27/2016
Number of Days to Update: 52	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 01/07/2016	Source: EPA Region 10
Date Data Arrived at EDR: 01/08/2016	Telephone: 206-553-2857
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 41	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010	Source: FEMA
Date Data Arrived at EDR: 02/16/2010	Telephone: 202-646-5797
Date Made Active in Reports: 04/12/2010	Last EDR Contact: 04/11/2016
Number of Days to Update: 55	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Varies

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 03/02/2016	Source: Division of Environmental Protection
Date Data Arrived at EDR: 03/03/2016	Telephone: 304-926-0495
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 02/29/2016
Number of Days to Update: 43	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Annually

AST: Aboveground Storage Tanks
A listing of aboveground storage tank site locations.

Date of Government Version: 01/25/2016	Source: DEP
Date Data Arrived at EDR: 01/28/2016	Telephone: 304-926-0499
Date Made Active in Reports: 03/08/2016	Last EDR Contact: 04/25/2016
Number of Days to Update: 40	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 08/20/2015	Source: EPA Region 6
Date Data Arrived at EDR: 10/30/2015	Telephone: 214-665-7591
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 111	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014	Source: EPA Region 7
Date Data Arrived at EDR: 11/25/2014	Telephone: 913-551-7003
Date Made Active in Reports: 01/29/2015	Last EDR Contact: 04/29/2016
Number of Days to Update: 65	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/13/2015	Source: EPA Region 8
Date Data Arrived at EDR: 10/23/2015	Telephone: 303-312-6137
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 118	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/20/2015	Source: EPA, Region 1
Date Data Arrived at EDR: 10/29/2015	Telephone: 617-918-1313
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 67	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 11/24/2015	Source: EPA Region 4
Date Data Arrived at EDR: 12/01/2015	Telephone: 404-562-9424
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/26/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2015	Source: EPA Region 5
Date Data Arrived at EDR: 11/13/2015	Telephone: 312-886-6136
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 04/27/2016
Number of Days to Update: 52	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 01/07/2016	Source: EPA Region 10
Date Data Arrived at EDR: 01/08/2016	Telephone: 206-553-2857
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/29/2016
Number of Days to Update: 41	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014	Source: EPA Region 9
Date Data Arrived at EDR: 02/13/2015	Telephone: 415-972-3368
Date Made Active in Reports: 03/13/2015	Last EDR Contact: 04/27/2016
Number of Days to Update: 28	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

State and tribal institutional control / engineering control registries

INST CONTROL: Sites with Institutional Controls
Sites that have institutional controls in place.

Date of Government Version: 01/20/2016	Source: Department of Environmental Protection
Date Data Arrived at EDR: 02/26/2016	Telephone: 304-558-2508
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 02/22/2016
Number of Days to Update: 49	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Varies

State and tribal voluntary cleanup sites

VCP: Voluntary Remediation Sites
Sites involved in the Voluntary Remediation Program.

Date of Government Version: 01/20/2016	Source: Department of Environmental Protection
Date Data Arrived at EDR: 02/26/2016	Telephone: 304-558-2745
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 02/22/2016
Number of Days to Update: 49	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Semi-Annually

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015	Source: EPA, Region 1
Date Data Arrived at EDR: 09/29/2015	Telephone: 617-918-1102
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 04/01/2016
Number of Days to Update: 142	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Sites Listing
Brownfields are abandoned, idle or underused commercial or industrial properties, where the expansion or redevelopment is hindered by real or perceived contamination. Brownfields vary in size, location, age, and past use -- they can be anything from a five-hundred acre automobile assembly plant to a small, abandoned corner gas station.

Date of Government Version: 05/14/2013	Source: Department of Environmental Protection
Date Data Arrived at EDR: 07/05/2013	Telephone: 304-926-0455
Date Made Active in Reports: 08/15/2013	Last EDR Contact: 04/01/2016
Number of Days to Update: 41	Next Scheduled EDR Contact: 07/11/2016
	Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/22/2015
Date Data Arrived at EDR: 12/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/22/2016
Next Scheduled EDR Contact: 07/04/2016
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 04/27/2016
Next Scheduled EDR Contact: 08/15/2016
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/21/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: No Update Planned

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 09/17/2015
Date Data Arrived at EDR: 12/04/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 76

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/01/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: No Update Planned

CDL: Drug Lab Site Locations

A listing of clandestine drug lab site locations.

Date of Government Version: 06/18/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 11/19/2015
Number of Days to Update: 23

Source: Department of Environmental Protection
Telephone: 304-926-0499
Last EDR Contact: 04/13/2016
Next Scheduled EDR Contact: 07/25/2016
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/17/2015
Date Data Arrived at EDR: 12/04/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 76

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/01/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Quarterly

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/26/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/24/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 68

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

SPILLS: Spills Listing

A listing of spills and releases reported to the Office of Emergency Services, they do not include any TRI information.

Date of Government Version: 01/26/2016
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 03/08/2016
Number of Days to Update: 39

Source: Office of Emergency Services
Telephone: 304-558-5380
Last EDR Contact: 04/25/2016
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/09/2015
Date Data Arrived at EDR: 03/02/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/11/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 11/10/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/15/2016
Number of Days to Update: 62	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005	Source: U.S. Geological Survey
Date Data Arrived at EDR: 02/06/2006	Telephone: 888-275-8747
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/15/2016
Number of Days to Update: 339	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/09/2011	Telephone: 615-532-8599
Date Made Active in Reports: 05/02/2011	Last EDR Contact: 02/19/2016
Number of Days to Update: 54	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/01/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/03/2015	Telephone: 202-566-1917
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 02/16/2016
Number of Days to Update: 61	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/21/2014	Telephone: 617-520-3000
Date Made Active in Reports: 06/17/2014	Last EDR Contact: 05/09/2016
Number of Days to Update: 88	Next Scheduled EDR Contact: 08/22/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/03/2015	Telephone: 703-308-4044
Date Made Active in Reports: 03/09/2015	Last EDR Contact: 02/12/2016
Number of Days to Update: 6	Next Scheduled EDR Contact: 05/23/2016
	Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012	Source: EPA
Date Data Arrived at EDR: 01/15/2015	Telephone: 202-260-5521
Date Made Active in Reports: 01/29/2015	Last EDR Contact: 03/24/2016
Number of Days to Update: 14	Next Scheduled EDR Contact: 07/04/2016
	Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014	Source: EPA
Date Data Arrived at EDR: 11/24/2015	Telephone: 202-566-0250
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 02/24/2016
Number of Days to Update: 133	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009	Source: EPA
Date Data Arrived at EDR: 12/10/2010	Telephone: 202-564-4203
Date Made Active in Reports: 02/25/2011	Last EDR Contact: 04/25/2016
Number of Days to Update: 77	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013	Source: EPA
Date Data Arrived at EDR: 12/12/2013	Telephone: 703-416-0223
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 03/08/2016
Number of Days to Update: 74	Next Scheduled EDR Contact: 06/20/2016
	Data Release Frequency: Annually

RMP: Risk Management Plans

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/26/2015	Telephone: 202-564-8600
Date Made Active in Reports: 11/03/2015	Last EDR Contact: 04/25/2016
Number of Days to Update: 69	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 10/17/2014	Telephone: 202-564-6023
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 02/12/2016
Number of Days to Update: 3	Next Scheduled EDR Contact: 05/23/2016
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014	Source: EPA
Date Data Arrived at EDR: 10/15/2014	Telephone: 202-566-0500
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 04/12/2016
Number of Days to Update: 33	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 02/06/2015	Telephone: 202-564-5088
Date Made Active in Reports: 03/09/2015	Last EDR Contact: 04/08/2016
Number of Days to Update: 31	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 02/22/2016
Number of Days to Update: 25	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009	Source: EPA
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 02/22/2016
Number of Days to Update: 25	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/07/2016	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 03/18/2016	Telephone: 301-415-7169
Date Made Active in Reports: 04/15/2016	Last EDR Contact: 05/06/2016
Number of Days to Update: 28	Next Scheduled EDR Contact: 08/22/2016
	Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005	Source: Department of Energy
Date Data Arrived at EDR: 08/07/2009	Telephone: 202-586-8719
Date Made Active in Reports: 10/22/2009	Last EDR Contact: 04/15/2016
Number of Days to Update: 76	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/10/2014	Telephone: N/A
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 03/11/2016
Number of Days to Update: 40	Next Scheduled EDR Contact: 06/20/2016
	Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/19/2011	Telephone: 202-566-0517
Date Made Active in Reports: 01/10/2012	Last EDR Contact: 04/26/2016
Number of Days to Update: 83	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 07/07/2015
Date Data Arrived at EDR: 07/09/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 69

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/08/2016
Next Scheduled EDR Contact: 07/18/2016
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transportation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transportation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/04/2016
Next Scheduled EDR Contact: 08/15/2016
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/24/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/26/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Biennially

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005	Source: USGS
Date Data Arrived at EDR: 12/08/2006	Telephone: 202-208-3710
Date Made Active in Reports: 01/11/2007	Last EDR Contact: 04/15/2016
Number of Days to Update: 34	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 11/23/2015	Source: Department of Energy
Date Data Arrived at EDR: 11/24/2015	Telephone: 202-586-3559
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 05/09/2016
Number of Days to Update: 86	Next Scheduled EDR Contact: 08/22/2016
	Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010	Source: Department of Energy
Date Data Arrived at EDR: 10/07/2011	Telephone: 505-845-0011
Date Made Active in Reports: 03/01/2012	Last EDR Contact: 03/28/2016
Number of Days to Update: 146	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/26/2014	Telephone: 703-603-8787
Date Made Active in Reports: 01/29/2015	Last EDR Contact: 04/07/2016
Number of Days to Update: 64	Next Scheduled EDR Contact: 07/18/2016
	Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931 and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001	Source: American Journal of Public Health
Date Data Arrived at EDR: 10/27/2010	Telephone: 703-305-6451
Date Made Active in Reports: 12/02/2010	Last EDR Contact: 12/02/2009
Number of Days to Update: 36	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/24/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data A listing of minor source facilities.

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/24/2016
Next Scheduled EDR Contact: 07/11/2016
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/09/2016
Date Data Arrived at EDR: 03/02/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 44

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/02/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/20/2015
Date Data Arrived at EDR: 09/09/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 55

Source: EPA
Telephone: (215) 814-5000
Last EDR Contact: 03/08/2016
Next Scheduled EDR Contact: 06/20/2016
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 03/01/2016	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/03/2016	Telephone: 202-564-0527
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 02/24/2016
Number of Days to Update: 33	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015	Source: Department of Defense
Date Data Arrived at EDR: 01/29/2016	Telephone: 571-373-0407
Date Made Active in Reports: 04/05/2016	Last EDR Contact: 04/18/2016
Number of Days to Update: 67	Next Scheduled EDR Contact: 07/04/2016
	Data Release Frequency: Varies

AIRS: Permitted Facility and Emissions Listing

Permitted facility and emissions information listing.

Date of Government Version: 12/31/2015	Source: Department of Environmental Protection
Date Data Arrived at EDR: 01/29/2016	Telephone: 304-926-0499
Date Made Active in Reports: 03/08/2016	Last EDR Contact: 04/25/2016
Number of Days to Update: 39	Next Scheduled EDR Contact: 08/08/2016
	Data Release Frequency: Varies

COAL ASH: Coal Ash Landfills

A listing of coal ash landfill site locations.

Date of Government Version: 04/07/2011	Source: Department of Environmental Protection
Date Data Arrived at EDR: 04/27/2011	Telephone: 304-926-0499
Date Made Active in Reports: 06/02/2011	Last EDR Contact: 04/11/2016
Number of Days to Update: 36	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Varies

DRYCLEANERS: Listing of Drycleaner Locations

A listing of drycleaners which use perchloroethylene.

Date of Government Version: 05/19/2015	Source: Department of Environmental Protection
Date Data Arrived at EDR: 05/22/2015	Telephone: 304-926-0475
Date Made Active in Reports: 07/20/2015	Last EDR Contact: 02/16/2016
Number of Days to Update: 59	Next Scheduled EDR Contact: 05/30/2016
	Data Release Frequency: Varies

Financial Assurance: Financial Assurance Information Listing

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 03/05/2013	Source: Department of Environmental Protection
Date Data Arrived at EDR: 03/07/2013	Telephone: 304-926-0499
Date Made Active in Reports: 04/05/2013	Last EDR Contact: 02/29/2016
Number of Days to Update: 29	Next Scheduled EDR Contact: 06/13/2016
	Data Release Frequency: Varies

NPDES: Wastewater Discharge Permits Listing

A listing of wastewater discharge permits.

Date of Government Version: 01/21/2016	Source: Department of Environmental Protection
Date Data Arrived at EDR: 01/26/2016	Telephone: 304-926-0495
Date Made Active in Reports: 03/08/2016	Last EDR Contact: 04/19/2016
Number of Days to Update: 42	Next Scheduled EDR Contact: 08/01/2016
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UIC: Underground Injection Wells

A listing of underground injection well locations.

Date of Government Version: 01/26/2016	Source: Department of Environmental Protection
Date Data Arrived at EDR: 01/28/2016	Telephone: 304-926-0499
Date Made Active in Reports: 03/08/2016	Last EDR Contact: 01/28/2016
Number of Days to Update: 40	Next Scheduled EDR Contact: 05/09/2016
	Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/20/2015	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/23/2015	Telephone: 202-564-2280
Date Made Active in Reports: 01/04/2016	Last EDR Contact: 03/23/2016
Number of Days to Update: 103	Next Scheduled EDR Contact: 07/04/2016
	Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/23/2015	Source: EPA
Date Data Arrived at EDR: 11/24/2015	Telephone: 800-385-6164
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 02/24/2016
Number of Days to Update: 86	Next Scheduled EDR Contact: 06/06/2016
	Data Release Frequency: Quarterly

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Division of Environmental Protection in West Virginia.

Date of Government Version: N/A	Source: Division of Environmental Protection
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 01/20/2014	Last EDR Contact: 06/01/2012
Number of Days to Update: 203	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Division of Environmental Protection in West Virginia.

Date of Government Version: N/A	Source: Division of Environmental Protection
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 12/30/2013	Last EDR Contact: 06/01/2012
Number of Days to Update: 182	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2013	Source: Department of Environmental Protection
Date Data Arrived at EDR: 07/17/2015	Telephone: N/A
Date Made Active in Reports: 08/12/2015	Last EDR Contact: 04/12/2016
Number of Days to Update: 26	Next Scheduled EDR Contact: 07/25/2016
	Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 02/01/2016
Date Data Arrived at EDR: 02/03/2016
Date Made Active in Reports: 03/22/2016
Number of Days to Update: 48

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/06/2016
Next Scheduled EDR Contact: 08/15/2016
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/24/2015
Date Made Active in Reports: 08/18/2015
Number of Days to Update: 25

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/18/2016
Next Scheduled EDR Contact: 08/01/2016
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 03/21/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/14/2016
Next Scheduled EDR Contact: 06/27/2016
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data

Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Public Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Day Care Center List

Source: Office of Social Services

Telephone: 304-558-7980

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory

Source: US Fish & Wildlife Service

Telephone: 703-358-2171

Current USGS 7.5 Minute Topographic Map

Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK[®] - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

BLUESTONE DAM
701 MILLER AVE
HINTON, WV 25951

TARGET PROPERTY COORDINATES

Latitude (North): 37.640769 - 37° 38' 26.77"
Longitude (West): 80.886475 - 80° 53' 11.31"
Universal Transverse Mercator: Zone 17
UTM X (Meters): 510015.9
UTM Y (Meters): 4165760.0
Elevation: 1362 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map: 6008643 HINTON, WV
Version Date: 2014

Northeast Map: 6008663 TALCOTT, WV
Version Date: 2014

Southeast Map: 6008633 FOREST HILL, WV
Version Date: 2014

Southwest Map: 6008655 PIPESTEM, WV
Version Date: 2014

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County
SUMMERS, WV

FEMA Flood
Electronic Data
YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 54089C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property
HINTON

NWI Electronic
Data Coverage
YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

<u>MAP ID</u>	<u>LOCATION FROM TP</u>	<u>GENERAL DIRECTION GROUNDWATER FLOW</u>
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era: Paleozoic
System: Mississippian
Series: Mississippian
Code: M (decoded above as Era, System & Series)

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name: CATEACHE

Soil Surface Texture: channery - silt loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: MODERATE

Depth to Bedrock Min: > 20 inches

Depth to Bedrock Max: > 40 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
Layer	Boundary		Soil Texture Class	Classification		Permeability Rate (in/hr)	Soil Reaction (pH)
	Upper	Lower		AASHTO Group	Unified Soil		
1	0 inches	6 inches	channery - silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay Soils.	Max: 2.00 Min: 0.60	Max: 6.00 Min: 4.50
2	6 inches	28 inches	channery - silty clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 2.00 Min: 0.60	Max: 6.00 Min: 4.50
3	28 inches	32 inches	very channery - silty clay loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel. COARSE-GRAINED SOILS, Gravels, Gravels with fines, Clayey Gravel.	Max: 2.00 Min: 0.60	Max: 6.00 Min: 5.10
4	32 inches	36 inches	weathered bedrock	Not reported	Not reported	Max: 0.00 Min: 0.00	Max: 0.00 Min: 0.00

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: very stony - silt loam
silt loam
channery - sandy loam
loam

Surficial Soil Types: very stony - silt loam
silt loam
channery - sandy loam
loam

Shallow Soil Types: channery - loam
silt loam
channery - sandy loam
clay loam

Deeper Soil Types: silty clay loam
unweathered bedrock
silt loam

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

<u>DATABASE</u>	<u>SEARCH DISTANCE (miles)</u>
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
A1	USGS40001294306	1/2 - 1 Mile NNW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

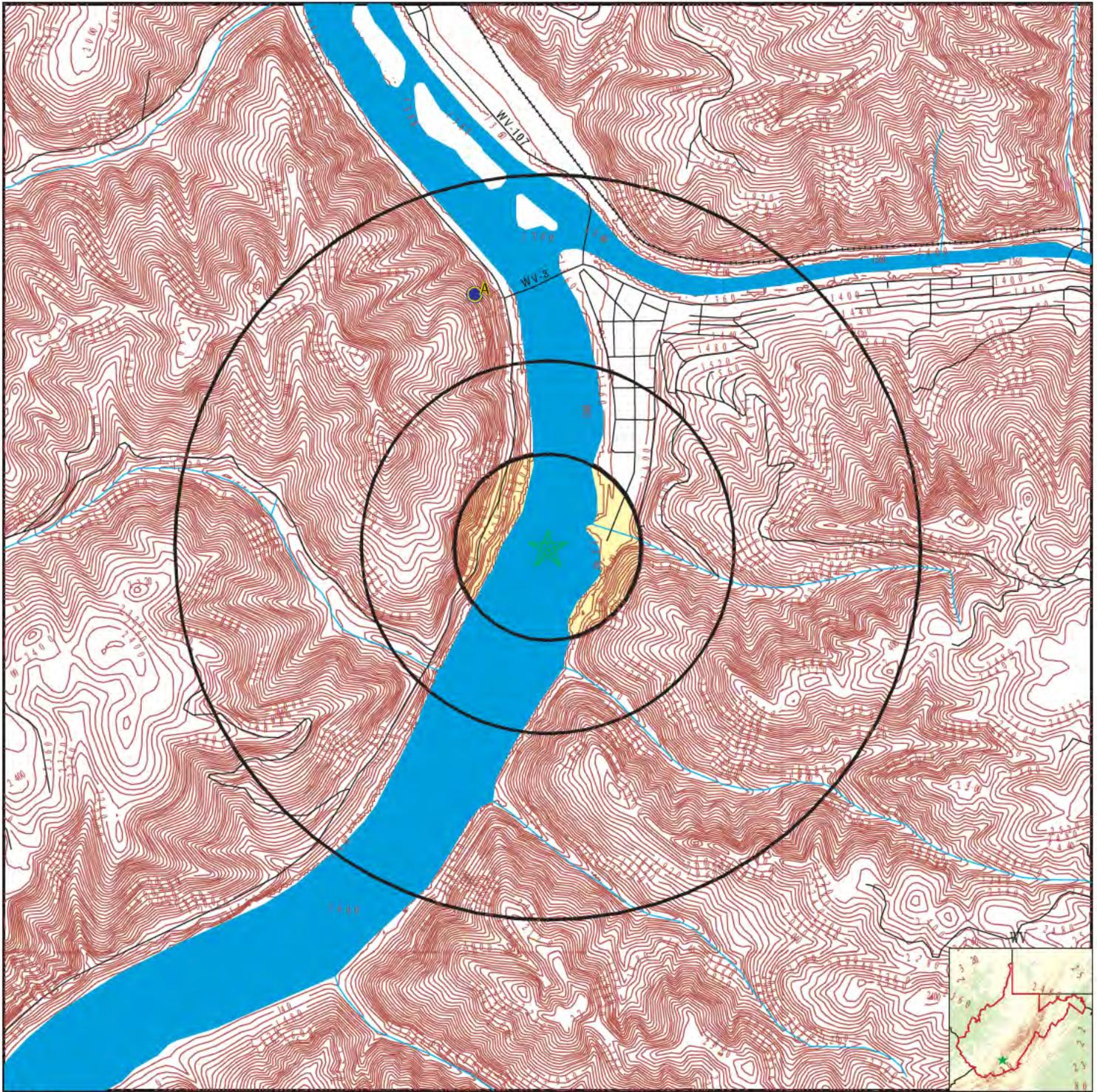
<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

<u>MAP ID</u>	<u>WELL ID</u>	<u>LOCATION FROM TP</u>
A2	WVWELL0228	1/2 - 1 Mile NNW

PHYSICAL SETTING SOURCE MAP - 4614459.4s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Oil, gas or related wells

SITE NAME: Bluestone Dam
 ADDRESS: 701 Miller Ave
 Hinton WV 25951
 LAT/LONG: 37.640769 / 80.886475

CLIENT: U.S. Army Corps of Engineers
 CONTACT: Dan Stark
 INQUIRY #: 4614459.4s
 DATE: May 10, 2016 12:58 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
 Direction
 Distance
 Elevation

Database EDR ID Number

A1
NNW
1/2 - 1 Mile
Higher

FED USGS USGS40001294306

Org. Identifier:	USGS-WV		
Formal name:	USGS West Virginia Water Science Center		
Monloc Identifier:	USGS-373900080532501		
Monloc name:	Sum-0044		
Monloc type:	Well		
Monloc desc:	Original station name was JOHNS DAIRYETTE		
Huc code:	05050004	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contr b drainagearea:	Not Reported
Contr b drainagearea units:	Not Reported	Latitude:	37.6501193
Longitude:	-80.8900868	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	85
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

A2
NNW
1/2 - 1 Mile
Higher

WV WELLS WWWELL0228

Id number:	1349	Pwsid:	WV9945021
Sys name:	KIRKS		
Facility id:	567051		
Fac name:	WV9945021#01		
City:	HINTON	County:	SUMMERS
Act status:	A	Water type:	Groundwater
Owner type:	Private	Daily prod:	0
Sys popula:	100	Sys type:	Non Community
Latitude:	37.651111	Longitude:	-80.89
Elevation:	0	Updated:	Not Reported
Wdate:	Not Reported		
Descriptio:	Not Reported		
User initi:	Not Reported	Gudi statu:	No
Sourcetype:	Not Reported	Whp radius:	750
Prod gpd:	2500	Conv facto:	25
Calc pop:	100	Seasonbegi:	Not Reported
Season end:	Not Reported	Facility type:	Well

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS RADON

AREA RADON INFORMATION

EPA Region 3 Statistical Summary Readings for Zip Code: 25951

Number of sites tested: 41.

Maximum Radon Level: 18.3 pCi/L.

Minimum Radon Level: 0.3 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
32 (78.05%)	7 (17.07%)	2 (4.88%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

Federal EPA Radon Zone for SUMMERS County: 1

- Note: Zone 1 indoor average level > 4 pCi/L.
 : Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
 : Zone 3 indoor average level < 2 pCi/L.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)

Source: United States Geologic Survey

EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map

Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory

Source: US Fish & Wildlife Service

Telephone: 703-358-2171

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System

Source: EDR proprietary database of groundwater flow information

EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit

Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Be kman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)

Telephone: 800-672-5559

SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)

This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

West Virginia Water Well Information

Source: Bureau of Public Health

Telephone: 304-558-6765

OTHER STATE DATABASE INFORMATION

West Virginia Oil and Gas Well Database

Source: Department of Environmental Protection

Telephone: 304-926-0450

Oil and Gas well locations in the state.

RADON

Area Radon Information

Source: USGS

Telephone: 703-356-4020

The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones

Source: EPA

Telephone: 703-356-4020

Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

EPA Region 3 Statistical Summary Readings

Source: Region 3 EPA

Telephone: 215-814-2082

Radon readings for Delaware, D.C., Maryland, Pennsylvania, Virginia and West Virginia.

OTHER

Airport Landing Facilities: Private and public use landing facilities

Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater

Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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Bluestone Dam

701 Miller Ave

Hinton, WV 25951

Inquiry Number: 4614459.5

May 10, 2016

Certified Sanborn® Map Report



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

05/10/16

Site Name:

Bluestone Dam
701 Miller Ave
Hinton, WV 25951
EDR Inquiry # 4614459.5

Client Name:

U.S. Army Corps of Engineers
502 8th Street
Huntington, WV 25701
Contact: Dan Stark



The Sanborn Library has been searched by EDR and maps covering the target property location as provided by U.S. Army Corps of Engineers were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 2C44-40D5-82C2
PO # NA
Project Bluestone DSMS

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.



Sanborn® Library search results

Certification #: 2C44-40D5-82C2

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- Library of Congress
- University Publications of America
- EDR Private Collection

The Sanborn Library LLC Since 1866™

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Bluestone Dam

701 Miller Ave
Hinton, WV 25951

Inquiry Number: 4614459.8
May 11, 2016

The EDR-City Directory Abstract

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1993 through 2013. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

<u>Year</u>	<u>Source</u>	<u>TP</u>	<u>Adjoining</u>	<u>Text Abstract</u>	<u>Source Image</u>
2013	Cole Information Services	-	-	-	-
2008	Cole Information Services	-	-	-	-
2003	Cole Information Services	-	-	-	-
1998	Cole Information Services	-	-	-	-
1993	Cole Information Services	-	-	-	-

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

701 Miller Ave
Hinton, WV 25951

FINDINGS DETAIL

Target Property research detail.

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

No Addresses Found

FINDINGS

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched

701 Miller Ave

Address Not Identified in Research Source

2013, 2008, 2003, 1998, 1993

APPENDIX D
ERGO REPORT

BLUESTONE LAKE
Environmental Compliance Review
Cycle IV
Executive Summary

GENERAL:

This report presents the results of an Environmental Compliance Review conducted by District personnel on 8-10 August 2006, at Bluestone Lake (CELRH-OR-BLN) project and at outgranted facilities on Corps property at Bluestone Lake. The outgranted facilities reviewed were American Electric Power (Flyash Disposal Area), Bluestone Conference Center, Bluestone State Park, Bluestone State Park Marina, Bluestone Treatment Plant (Raw Water Pumping Station), Glen Lyn Park, West Virginia Division of Natural Resources (WVDNR) Bluestone Wildlife Management Area, and WVDNR Wildlife Section. Previous Environmental Compliance Reviews at this site were conducted on 24-26 May 1993 (Cycle I), 16-19 April 1996 (Cycle II), and 25-27 September 2001 (Cycle III), and were referenced during this review. The review was conducted under the protocols of The Environmental Assessment and Management (TEAM) guide, developed by USACERL (Special Report EC 95/05, November 1994). The purpose of the review was to ensure that routine business of the Operations project, as well as all outgranted facilities, are in compliance with all Federal, State and local environmental laws, regulations, and directives.

This "External" Environmental Compliance Review provides an environmental "snapshot in time;" in this case 8-10 August 2006, and will not reflect improvements made since that time by the project or its outgranted facilities; it documents what the conditions were at the time the assessment was undertaken. This provides a record of the environmental health of a project and outgrants on the record date, as well as providing a basis against which progress can be measured. For the next four fiscal years, Bluestone Lake (excluding the outgrants) will undergo an annual "Internal" Assessment, which documents progress made against any findings in this report, lists any new findings since this report, and addresses the status of any uncorrected findings.

BACKGROUND:

Bluestone Lake is located in Hinton, West Virginia. Construction on the dam began on 19 January 1942. Work was suspended during World War II and resumed in January 1946. The project was completed for operational purposes in January 1949. Total construction cost was approximately \$30 million. The reservoir is operated for the control of floods on the New and Kanawha Rivers, and is part of the flood control system for the Ohio and Mississippi Rivers. The operation of Bluestone Lake, in combination with Sutton Lake on the Elk River and Summersville Lake on the Gauley River, provides protection from floods for the highly populated and industrialized Kanawha River valley. These three reservoirs control 57 percent of the total drainage area at Charleston, and Bluestone Lake controls 44 percent of this total. When

Bluestone Dam was built, hydroelectric power was authorized and six penstocks (sluiceways for guiding water to generators) were installed for future use. In 2001, the dam stabilization and modernization project and a hydroelectric power installation project were commenced. The top length of the dam is 2,048 feet, with a top width of 16 feet, and the maximum base width is 200 feet. The top of the dam is at elevation 1,535 feet. There are 21 crest gates measuring 30 feet in width by 31 feet high. The maximum discharge capacity is 430,000 cubic feet per second. Project personnel manage the dam site and operate the structure, to include parking, a scenic overlook, picnic facilities, and an Interpretive Center. Other facilities include a State Park, marina, camping, cabins, boating, fishing, skiing, and other recreational activities.

PROCEDURE AND PERSONNEL:

This Environmental Compliance Review considered the twelve major environmental compliance categories, with special emphasis to those pertinent to the site. It was conducted by a team effort of trained Operations and Real Estate personnel from the District Office, and Bluestone Lake project personnel. Members of this team review were:

Denis Chabot, PE, Environmental Engineer – CELRH-OR-E (Team Leader)
Melva Adkins, Realty Specialist – CELRH-RE-MM

Assisting from the Bluestone Lake project was:

Lloyd D. (Dean) Bonifacio, Park Manager – CELRH-OR-BLN
Tommy Blankenship, Maintenance Worker – CELRH-OR-BLN
David E. Staley, Maintenance Mechanic Leader – CELRH-OR-BLN

Assisting from the Kanawha Area Office was:

Edward A. Nicklow, Park Manager – CELRH-OR-KAO

The team was met and assisted at American Electric Power Flyash Disposal Area by:

Joe Ryder, Plant Environmental Coordinator – American Electric Power
Lee McKinney, Technician – American Electric Power

The team was met and assisted at the Bluestone Conference Center by:

Mark Miller, Camp Director

The team was met and assisted at Bluestone State Park by:

Brett McMillion, Superintendent

The team was met and assisted at the Bluestone State Park Marina by Melvin Ryan

The team was met and assisted at the Bluestone Treatment Plant, Raw Water Pumping Station by:

John Pentasuglia, Production Supervisor
Dave Thomas, Water Quality Supervisor

The team was met and assisted at Glen Lyn Park by:

Howard Spencer – Town of Glen Lyn, Virginia

The team was met and assisted at the West Virginia Division of Natural Resources Bluestone Wildlife Management Area by:

Melissa Pettrey, Administrative Assistant – WVDNR

The team was met and assisted at the West Virginia Division of Natural Resources Wildlife Section, by:

Ronald L. Roles, Wildlife Manager – WVDNR

COMPLIANCE CATEGORIES:

The compliance categories considered were:

- Category I – Air Emissions Management
- Category II – Cultural & Historic Resources Management
- Category III – Hazardous Materials Management
- Category IV – Hazardous Waste Management
- Category V – Natural Resource Management
- Category VI – Pesticide Management
- Category VII – Petroleum, Oil, & Lubricant Management
- Category VIII – Solid Waste Management
- Category IX – Special Pollutants Management: Radon, PCB's, Asbestos & Noise
- Category X – Underground Storage Tanks (USTs) Management
- Category XI – Waste Water Management
- Category XII – Water Quality Management

CATEGORY OF FINDINGS:

For the purpose of this summary, "comments" and "findings" are described as:

- a. **SIGNIFICANT:** A finding requiring immediate action to mitigate direct threats to human health, safety, environment, or the site mission.
- b. **MAJOR:** A finding which requires a relatively large commitment of time, human resources, or financial resources, but poses no immediate threat to human health, safety, environment, or the site mission.
- c. **MINOR:** A finding that can be addressed with relatively modest expenditures of time, human resources, and/or financial resources.
- d. **GENERAL COMMENT:** A comment on a positive (good) or poor management practice, but one that is not a violation of any federal, state or local law.

SUMMARY OF FINDINGS:

BLUESTONE PROJECT SITE: The environmental program at Bluestone Lake is **very good**, and no Significant, Major or Minor findings of non-compliance were noted at the project site during this review. **13 comments** of a general nature (plus **1 positive comment**) are found within.

OUTGRANTS: Findings of non-compliance were noted for the outgranted areas. **1 Major finding**, **4 Minor findings** and **31 comments** of a general nature (plus **4 positive comments**) are listed. Efforts continue by the Real Estate Division to convince the parties responsible at the outgranted areas to bring those facilities into compliance.

APPENDICES (SPECIFIC COMMENTS) FOR OPERATIONS PROJECTS:

Appendix A-1 provides a summary of specific comments by category for Corps facilities at Bluestone Lake under the management of Operations and Readiness Division personnel. The Appendix indicates that the environmental program at facilities under Operations and Readiness Division at Bluestone Lake are well managed, and no significant, major or minor findings of any non-compliance were noted at the project site during this review.

Appendix A-2 contains detailed descriptions of the **13 general comments** pertaining to the Bluestone Lake project (including the Contractor Compound, but not including outgranted areas, which are not the responsibility of Bluestone O&M personnel). In addition, each finding or comment contains a recommended corrective action. Note that the recommendation is just that of the team members, and Bluestone Lake's Park Manager is encouraged to solicit other ideas or implement local ideas towards these improvements.

APPENDICES (SPECIFIC FINDINGS) FOR OUTGRANTED (REAL ESTATE) AREAS:

Findings of major and minor non-compliance were noted at outgranted areas. Recommendations to correct the **1 Major finding, 4 Minor findings** and **31 comments** of a general nature are included. Efforts continue by the Real Estate Division to convince the parties responsible at the outgranted areas to bring those facilities into compliance.

Appendix B-1 provides a summary of specific findings by site pertaining to the outgranted areas within the boundaries of the Bluestone Lake project.

Appendix B-2(A,B,C,D,E,F,G,H) contains applicable comments and detailed descriptions of each finding pertaining to the outgranted areas within the boundaries of the Bluestone Lake project. Also included are recommended remedies to all findings.

Appendix B-2A provides information concerning environmental condition at the American Electric Power Flyash Disposal Area.

Appendix B-2B addresses findings/comments at the Bluestone Conference Center

Appendix B-2C addresses findings/comments at Bluestone State Park

Appendix B-2D addresses findings/comments at Bluestone State Park Marina

Appendix B-2E provides information concerning environmental condition at the Bluestone Treatment Plant (Raw Water Pumping Station)

Appendix B-2F addresses comments at Glen Lyn Park

Appendix B-2G addresses comments at the West Virginia Division of Natural Resources (WVDNR) Bluestone Wildlife Management Area

Appendix B-2H addresses findings/comments at the WVDNR – Wildlife Section

APPENDIX A - 1

SUMMARY OF FINDINGS BLUESTONE LAKE OPERATIONS AND READINESS DIVISION

The following summarizes the number and types of findings or comments for each category pertaining to facilities under the responsibility of the Operations and Readiness Division:

CATEGORY I – AIR EMISSIONS MANAGEMENT

No findings, facility in compliance

CATEGORY II – CULTURAL & HISTORIC RESOURCES MANAGEMENT

No findings, facility in compliance

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

No findings, 9 general comments, facility in compliance

CATEGORY IV – HAZARDOUS WASTE MANAGEMENT

No findings, facility in compliance

CATEGORY V – NATURAL RESOURCE MANAGEMENT

No findings, facility in compliance

CATEGORY VI – PESTICIDE MANAGEMENT

No findings, facility in compliance

CATEGORY VII – PETROLEUM, OIL, & LUBRICANT MANAGEMENT

No findings, 3 general comments, facility in compliance

CATEGORY VIII – SOLID WASTE MANAGEMENT

No findings, 1 general comment, facility in compliance

CATEGORY IX – SPECIAL POLLUTANTS MANAGEMENT: RADON, PCB'S, ASBESTOS & NOISE

No findings, facility in compliance

CATEGORY X – UNDERGROUND STORAGE TANKS (USTS) MANAGEMENT

No findings, facility in compliance

CATEGORY XI – WASTE WATER MANAGEMENT

No findings, facility in compliance, 1 positive comment

CATEGORY XII – WATER QUALITY MANAGEMENT

No findings, facility in compliance

APPENDIX A - 2

DETAILED FINDINGS & REMEDIES ENVIRONMENTAL COMPLIANCE REVIEW **BLUESTONE LAKE** OPERATIONS AND READINESS DIVISION

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

Location: Dam; Third Floor; Oil Closet

General Comment/Recommendation: The project does a good job of keeping many of the drums and containers of various materials in a single location in the Oil Closet on the third floor. No secondary containment has been made available for these materials. **Recommend** that the project utilize the Oil Closet room as secondary containment by installing a liquid proof lip completely across the access to the closet.

Location: Contractor Compound

General Comment/Recommendation: Gasoline and oil were observed being stored in the contractor's trailer. Secondary containment was not being provided, and any leak from the gasoline and oil containers would leak from the trailer and immediately contaminate the ground below. **Recommend** that all liquid fuels, oil, and other liquid chemicals be placed within proper secondary containment. Further, all gasoline should be stored at the point furthest from the door, to permit personnel to escape in the event of a fire.

Location: Old Barge

General Comment/Recommendation: Hydraulic hoses on old barge may degrade over time due to use, weather, and sunlight. Hydraulic hoses may not show signs of impending failure, but fail instantly under load. A ruptured hose under load can quickly evacuate the contents of the hydraulic tank into the environment. **Recommend** that:

- 1) The hoses frequently be visually inspected, and
- 2) That a hose change-out cycle be implemented and adhered to. This change-out cycle should be developed by determining from the manufacturer the maximum expected life of the hoses, then applying a factor to compensate for the effect of the hoses being out-of-doors year-round, in cold and hot weather, and sunlight.

Location: Old Barge

General Comment/Recommendation: A spill kit should be permanently stationed on the old barge for use if a hydraulic hose ruptures, or if any type of oil leak should occur. **Recommend** that this spill kit be obtained and stored in a clean, dry container which is covered to protect from sunlight, moisture, and heat to prevent premature deterioration of the absorbent material.

Location: Contractor Compound; Pole Building

General Comment/Recommendation: Various flammable and combustible materials are stored at the site. **Recommend** that National Fire Protection Association (NFPA) signs be posted on or next to the entrance to the Pole Building to assist emergency personnel. These signs should indicate the highest hazard levels contained in each building in the *Health* (blue), *Flammability* (red), and *Reactivity* (yellow) diamonds.



Location: Contractor Compound

General Comment/Recommendation: An unmarked drum of material was observed at the Contractor Compound. **Recommend** that this drum be either labeled or properly disposed of.

Location: Contractor Compound

General Comment/Recommendation: A propane tank at the contractor compound was not marked as to contents; there were also no warnings posted to prohibit smoking. **Recommend** that this tank be labeled as to contents, and “No Smoking within 50 feet” signs be conspicuously posted.

Location: Maintenance Compound; Truck-mounted Fuel Tank

General Comment/Recommendation: A truck-mounted fuel tank was observed at the Maintenance Compound which did not have warnings to prohibit smoking. **Recommend** that this tank be provided with “No Smoking” signs on all sides except for the side up against the truck cab.

Location: Contractor Compound

General Comment/Recommendation: Lead-acid batteries were observed under the trailer without secondary containment. **Recommend** that the batteries be placed in secondary containment; otherwise completely removed from the site and cores recycled.

CATEGORY VII – PETROLEUM, OIL, & LUBRICANT MANAGEMENT

Location: Dam; Fifth Floor

General Comment/Recommendation: An abandoned diesel tank remains in the dam; there are no plans to re-activate usage of this tank. **Recommend** that the tank be removed from the dam, cut into two or more pieces, and taken to the landfill. Special precautions are required prior to cutting fuel tanks; OR-BLN may contact OR-E for advice prior to taking this step.

Location: Dam; Fourth Floor

General Comment/Recommendation: An oil tank for the penstock gates has been installed on the Fourth Floor of the Dam which is not fitted with secondary containment. **Recommend** that adequate secondary containment be installed for this oil tank.

Location: Dam; Fourth Floor

General Comment/Recommendation: The hydraulic tank for the drift and debris tower is located on the Fourth Floor of the Dam, and does not have secondary containment. **Recommend** that adequate secondary containment be installed for the hydraulic tank.

CATEGORY VIII – SOLID WASTE MANAGEMENT

Location: Scrap Yard

General Comment/Recommendation: The scrap yard had an inordinate amount of material which was not cataloged and haphazardly stored. In addition to safety and some minor environmental concern, the material was obviously becoming waste

material, and the area is quickly becoming an unlicensed junk yard. **Recommend** that the scrap yard be given a discerning review for what to keep and what should be disposed of, either through recycling or paid landfill.

CATEGORY XI – WASTE WATER MANAGEMENT

Location: Lift Station (in field between Maintenance Compound and Dwelling)

General Comment: A pump test was performed on the lift station. All parts of the lift station were found to be in good condition and working properly. *(Note: That the Lift Station was found to be in excellent operating condition indicates a Good Management Practice).*

APPENDIX B - 1

SUMMARY OF FINDINGS BLUESTONE LAKE REAL ESTATE DIVISION (**OUTGRANTS**)

The following summarizes the number and types of findings or comments for each category pertaining to facilities under the responsibility of the Real Estate Division:

CATEGORY I – AIR EMISSIONS MANAGEMENT

No findings, all outgranted facilities in compliance

CATEGORY II – CULTURAL & HISTORIC RESOURCES MANAGEMENT

No findings, all outgranted facilities in compliance

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

Bluestone Conference Center: 1 Minor finding, 3 general comments

Bluestone State Park: 1 Minor finding, 8 general comments, 1 positive comment

Bluestone State Park Marina: 1 Major finding, 1 general comment

WVDNR Bluestone Wildlife Management Area: No findings, 8 general comments

WVDNR Wildlife Section (Parks): No findings, 3 general comments

No findings at other outgranted facilities; these other facilities in compliance

CATEGORY IV – HAZARDOUS WASTE MANAGEMENT

No findings, all outgranted facilities in compliance

CATEGORY V – NATURAL RESOURCE MANAGEMENT

No findings, all outgranted facilities in compliance

CATEGORY VI – PESTICIDE MANAGEMENT

No findings, all outgranted facilities in compliance

CATEGORY VII – PETROLEUM, OIL, & LUBRICANT MANAGEMENT

WVDNR Wildlife Section (Parks): 1 Minor finding

No findings at other outgranted facilities; these other facilities in compliance

CATEGORY VIII – SOLID WASTE MANAGEMENT

Bluestone State Park: No findings, 1 general comment

WVDNR Bluestone Wildlife Management Area: No findings, 1 general comment

No findings at other outgranted facilities; these other facilities in compliance

CATEGORY IX – SPECIAL POLLUTANTS MANAGEMENT: RADON, PCB'S, ASBESTOS & NOISE

No findings, all outgranted facilities in compliance

CATEGORY X – UNDERGROUND STORAGE TANKS (USTS) MANAGEMENT

No findings, all outgranted facilities in compliance

CATEGORY XI – WASTE WATER MANAGEMENT

Bluestone Conference Center: No findings, facility in compliance, 2 positive comments

Bluestone State Park Marina: 1 Minor finding

Glen Lyn Park: No findings, 1 general comment

No findings at other outgranted facilities; these other facilities in compliance

CATEGORY XII – WATER QUALITY MANAGEMENT

Bluestone Conference Center: No findings, 1 general comment, 1 positive comment

Bluestone State Park: No findings, 2 general comments

Glen Lyn Park: No findings, 1 general comment

WVDNR Wildlife Section (Parks): No findings, 1 general comment

No findings at other outgranted facilities; these other facilities in compliance

APPENDIX B – 2A

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
AMERICAN ELECTRIC POWER FLYASH DISPOSAL AREA
REAL ESTATE DIVISION (OUTGRANT)

NOTE: No findings were observed at the American Electric Power Flyash Disposal Area. The ERGO team reviewed practices at the site, and discussed procedures with the Plant Environmental Coordinator. Discussion focused on the processes for fly-ash compaction and cover.

The site is in excellent shape. Wild animals (deer, rabbit, waterfowl) were observed utilizing the reclaimed portions at the northern end of the site. No erosion or release of any fly-ash were noted.

The disposal area has a collection system and monitoring wells completely along the perimeter. Since the date of the inspection on 9 August 2006, AEP has submitted sampling reports to OR-E showing the results from these monitoring wells. All readings are either non-detectable or well below the limits which the State of Virginia Department of Environmental Quality (VDEQ) requires of AEP. The State also monitors air quality at the site.

The site will require perpetual mechanical “brush hogging” and monitoring by American Electric Power Company. Real Estate Division will need to require this.

(NOTE: American Electric Power is utilizing Good Management Practices with regards to the Glen Lyn Flyash Disposal Area).

APPENDIX B – 2B

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
BLUESTONE CONFERENCE CENTER
REAL ESTATE DIVISION (OUTGRANT)

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

Finding Number: BLN/06-03-001

Ranking: Minor

Location: Shop

Comment: Oil, 5-gallon gasoline cans, mineral spirits, and oil-based paint are being stored at this location without any secondary containment.

Recommendation: Gather all compatible materials together in a few distinct locations and provide adequate secondary containment. Adequate requires that the containment be large enough to hold 110 percent of the largest container in the system if a release occurs. Reminder when designing secondary containment: gasoline must be placed away from exits.

Location: Shop

General Comment/Recommendation: Unlabeled drums of used oil were observed at the site. The drums were also not provided with secondary containment. **Recommend** the drums be marked “USED OIL” in accordance with state law, and placed within adequate secondary containment.

Location: Shop

General Comment/Recommendation: Various materials are stored at the site. **Recommend** that National Fire Protection Association (NFPA) signs be posted on or next to the access doors of the Shop to assist emergency personnel. These signs should indicate the highest hazard levels contained in each building in the *Health* (blue), *Flammability* (red), and *Reactivity* (yellow) diamonds.



Locations:

- 1) Carpenter Shop
- 2) Pool

General Comment/Recommendation: MSDS sheets were only available in the Main Building, but were not available in the Carpenter Shop or at the Pool, where most materials were being stored and used. **Recommend** that Conference Center personnel ensure that MSDS sheets are available for all materials on site, and the these MSDS sheets are available at all times in the areas where the materials are being stored, mixed, applied or used.

CATEGORY XI – WASTE WATER MANAGEMENT

Location: Sewage Lagoon

General Comment: The Sewage Lagoon was checked and found to be operating properly. At this area there was no odor, and the NPDES permit had been secured. *(Note: This check of the Sewage Lagoon indicates that the Bluestone Conference Center operates this area using Good Management Practices).*

Location: Lift Station

General Comment: The Lift Station on the site was checked and found to be operating properly and maintained with no problems. *(Note: This indicates that the Bluestone Conference Center operates this area using Good Management Practices).*

CATEGORY XII – WATER QUALITY MANAGEMENT

Location: Water Plant

General Comment: The Water Plant was checked and found to be in good repair and utilizing good housekeeping and recordkeeping. A check of records of turbidity indicated that turbidity levels were on an order of magnitude 10 times lower than allowable. *(Note: This check of the turbidity at the Water Plant indicates that the Bluestone Conference Center operates this plant using Good Management Practices).*

Location: Main Building; and other areas on site

General Comment/Recommendation: At the Main Building, a hose was connected to a threaded spigot and was found lying in a sink. The spigot did not contain a vacuum breaker (backflow preventer), and the situation was perfect for the siphoning of contaminated water back into the drinking water system. **Recommend** that all threaded hose connections on site be inventoried and a vacuum breaker be placed on each threaded spigot. The Conference Center was provided with a working sample vacuum breaker and should purchase and install similar vacuum breakers for all remaining spigots.

APPENDIX B – 2C

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
BLUESTONE STATE PARK
REAL ESTATE DIVISION (OUTGRANT)

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

General Note:

Bluestone State Park corrected the most serious deficiency identified during the 2001 ERGO assessment, that of chlorine gas cylinders being employed as disinfectant for the swimming pool. Mishandling or accidental discharge of the chlorine gas, which is heavier than air and would have hovered just above the surface, could have resulted in many deaths and injuries during a day of heavy visitation. Park personnel have removed all cylinders from the system, and now utilize solid tablets for disinfections, which are easy to handle and improve safety. *(This correction indicates a Good Management Practice).*

Finding Number: BLN/06-03-002

Ranking: Minor

Location: Gas Shed

Comment: At this location, gasoline and diesel products are dispensed into equipment and vehicles. Currently, the fuel dispensing takes place on a surface of gravel over earth. Overfills or inattention could result in spills which immediately contaminate the environment.

Recommendation: Recommend that a fuel-dispensing pad be poured whenever funds permit. The surface of this pad should be liquid-tight, and sloped only gently (approx. 1/16" per foot or less) which will allow time for personnel to place absorbents on a spill when it occurs. Recommend also that the State Park personnel procure some absorbents in readiness for a spill event, storing them near the dispensing pumps in a position where they can be reached within a few seconds.

(Note: This was a general comment five years ago; it is elevated to a Minor Finding due to lack of attention to this easy fix, as well as continual fueling operations being performed at this location)

Location: Gas Shed

General Comment/Recommendation: Hydraulic oils, gasoline cans containing fuel, motor oil, transmission fluid, and kerosene are all being stored at the Gas Shed without proper secondary containment. **Recommend** that adequate secondary containment be provided for these and all other fuel and chemically-based products.

Location: Maintenance Shop

General Comment/Recommendation: Unlabeled drums of used oil were observed at the Maintenance Shop. **Recommend** the drums be marked "USED OIL" in accordance with state law. (See next comment concerning placement within adequate secondary containment).

Location: Maintenance Shop

General Comment/Recommendation: The secondary containment for the used oil at the Maintenance Shop was computed and was found to be inadequate at current 5' x 7' x less than 1.5 inches. For 110 percent of the largest container, the walls of the secondary containment must be 4 inches in height to provide adequate volume; currently the walls are just over 1 inch in height. **Recommend** the modification be made to increase the volume of the secondary containment.

Location: Maintenance Shop

General Comment/Recommendation: Waste batteries were being stored on a pallet by the side of the Maintenance Shop. In lieu of secondary containment for these batteries, **recommend** that these (battery) cores be removed from the site and taken to a recycling center.

Location: Office

General Comment/Recommendation: Propane tanks at the Office were not marked as to contents; there were also no warnings posted to prohibit smoking. **Recommend** that the tanks be labeled as to contents, and "No Smoking" signs be conspicuously posted.

Location: Pool

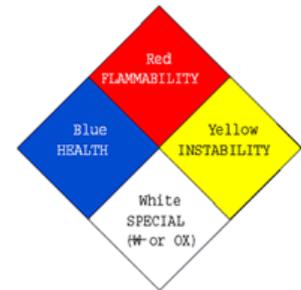
General Comment/Recommendation: Muriatic acid is being stored at the Pool without proper secondary containment. **Recommend** that adequate secondary containment be provided for the muriatic acid.

Location: Pool

General Comment/Recommendation: Chlorine and muriatic acid are being stored and used at the Pool, and Material Safety Data Sheets for these chemicals were not present. **Recommend** that MSDS sheets for all materials being used or stored at the Pool be obtained and placed in a convenient and conspicuous location.

Location: Maintenance Shop

General Comment/Recommendation: Various fuels and oils were being stored at the Maintenance Shop. **Recommend** that National Fire Protection Association (NFPA) signs be posted on or next to the access doors to assist emergency personnel. These signs should indicate the highest hazard levels contained in the building by placing the correct numbers in the *Health* (blue), *Flammability* (red), and *Reactivity* (yellow) diamonds.



CATEGORY VIII – SOLID WASTE MANAGEMENT

Location: Maintenance Shop

General Comment/Recommendation: Solid waste was building up on site and had been so for some time. **Recommend** that the solid waste be removed and properly disposed of.

CATEGORY XII – WATER QUALITY MANAGEMENT

Location: Sewage Treatment Plant

General Comment/Recommendation: A threaded hose connection at the Sewage Treatment Plant did not contain an anti-siphon backflow preventer. To protect the drinking water supply from possible contamination which might occur during low

pressure situations, **recommend** that this and all threaded hose connections on site be inventoried and a vacuum breaker be placed on each threaded spigot. State Park personnel were provided with a working sample vacuum breaker and should purchase and install similar vacuum breakers for all remaining threaded hose connections.

Location: Pool

General Comment/Recommendation: Backwash of filters is being discharged onto the ground. An NPDES permit had not been obtained from the State for this discharge. **Recommend** plumbing the backwash discharge into the existing lift station, which would take to backwash water to the sewage treatment plant. In lieu of this, if discharges are to remain unchanged, then **recommend** that the NPDES permit be secured and posted.

APPENDIX B – 2D

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
BLUESTONE STATE PARK MARINA
REAL ESTATE DIVISION (OUTGRANT)

CATEGORY VII – PETROLEUM, OIL, & LUBRICANT MANAGEMENT

Finding Number: BLN/06-07-001

Ranking: **MAJOR**

NOTE: These same findings were observed during Cycle III and documented as Finding Number BLN/01-07-001. These findings have not been corrected by the Bluestone State Park Marina.

Location: Marina, Fuel Oil Tank

Comment: The fuel oil tank was examined by the team and found lacking in several areas. These comments were made:

- 1) An electrical solenoid valve is absent and tank contents could be completely siphoned into lake.
- 2) Tank did not contain proper vents.
- 3) No smoking signs were absent from the tank.

Recommendations:

- 1) That a normally-closed electrical solenoid valve be provided on the tank to prevent the siphoning of the entire contents of the fuel tank into the lake in the event of an accident. The solenoid valve should be wired in conjunction with the dispensing pump, so that when the lever on the pump is raised, the solenoid is energized and opened (*Note: This absence of a siphon prevention device is the deficiency leading to the cause of the assignment of "Major finding."*)
 - 2) That the fuel storage tank be vented to a minimum of 12 feet above ground level.
 - 3) That "Flammable – No Smoking" signs be placed on all 4 sides of the fuel trailer.
-

Location: Marina

General Comment/Recommendation: Gas cans were outside of the fuel trailer without any secondary containment. **Recommend** that the gas cans be placed into adequate secondary containment.

CATEGORY XI – WASTE WATER MANAGEMENT

Finding Number: BLN/06-11-001

Ranking: Minor

Location: Residential Trailer

Comment: The toilet in the trailer is hooked up for use, but sewage outfall discharges into a gray water pit. There is no septic system at the location; no lift station and no commercial sewer. The hookup is not in conformance with code (illegal outfall).

Recommendation: Recommend that the toilet in the trailer be physically removed and the outlet pipe be plugged (and this step verified by the District); then the gray water pit can continue to be used for any sinks and laundry in the trailer.

NOTE: This same finding was observed during Cycle III and documented as Finding Number BLN/01-11-001. This finding was not corrected by the Bluestone State Park Marina.

APPENDIX B – 2E

**DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
BLUESTONE TREATMENT PLANT (RAW WATER PUMPING STATION)
REAL ESTATE DIVISION (OUTGRANT)**

General Note:

The ERGO Team met with the Raw Water Pumping Station management, and reviewed the physical facilities at the site. No deficiencies; therefore no findings or comments, were noted in the review. The Bluestone Treatment Plant (Raw Water Pumping Station) management is very interested in environmental protection, and are proving to be good partners with the Corps in this realm.

APPENDIX B – 2F

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
GLEN LYN PARK
REAL ESTATE DIVISION (OUTGRANT)

CATEGORY XI – WASTE WATER MANAGEMENT

Location: Glen Lyn Park; Trailers

General Comment/Recommendation: Part of Glen Lyn Park is a campground, so trailers are permitted to utilize the site. A trailer dump station is provided. However, on the day of the assessment, trailers for an event were also allowed to park behind the comfort station. It was one of these trailers where it was noted that the sewage discharge was exiting the trailer directly to the ground. Mr. Spencer of the town of Glen Lyn spoke with owners of the trailer and requested that they discontinue this practice. The owners were departing the site within two hours, but had been dumping wastewater onto the ground the entire week. Because of this incident, the ERGO team examined every trailer at the site to ensure no other were releasing wastewater, and determined that none were. **Recommend** that the City of Glen Lyn periodically check to ensure that no trailers are discharging wastewater rather than taking it to the dump station, and ensure that any permission given for a temporary trailer comes with a strict warning that there will be no tolerance for releasing wastewater onto the ground. Instances of this should be immediately reported to Real Estate Division.

CATEGORY XII – WATER QUALITY MANAGEMENT

Location: Various locations at site

General Comment/Recommendation: Several threaded hose connections were seen without anti-siphon backflow preventers. To protect the drinking water supply from possible contamination which might occur during low pressure situations, **recommend** that anti-siphon devices be purchased and placed on all threaded connections. The Superintendent of Public Works for Glen Lyn was provided with a working frostproof backflow preventer as a sample of what should be purchased for hose connectors. All additional backflow preventers should be purchased and installed by the town.

APPENDIX B – 2G

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
WEST VIRGINIA DIVISION OF NATURAL RESOURCES
BLUESTONE WILDLIFE MANAGEMENT AREA
REAL ESTATE DIVISION (OUTGRANT)

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

Location: Gashouse

General Comment/Recommendation: A large amount of fuel and oils in 55 gallon drums are stored and used out of the Gashouse. The gashouse has no secondary containment for any of the materials. **Recommend** adequate secondary containment be provided for these materials. On the day of the assessment, adequate secondary containment would have been a minimum of 61 gallons. Due to the large number of drums and other primary containers, recommend that the Gashouse itself be sealed to become secondary containment.

.....

Location: Gashouse

General Comment/Recommendation: Unlabeled drums of used oil were observed at the Gashouse. **Recommend** the drums be marked "USED OIL" in accordance with state law.

.....

Location: Gashouse

General Comment/Recommendation: Some containers at the Gashouse were unlabeled, and Bluestone Wildlife Management Area personnel could not identify some of the materials in the unmarked containers. Other containers were mislabeled. **Recommend** that all materials in the containers be identified, and all containers properly marked.

.....

Location: Gashouse

General Comment/Recommendation: At this location, gasoline and diesel products are dispensed into equipment and vehicles. Currently, the fuel dispensing takes place on a surface of gravel over earth. Overfills or inattention could result in spills which immediately contaminate the environment. **Recommend** that a fuel-dispensing pad be poured whenever funds permit. The surface of this pad should be liquid-tight, and sloped only gently (1/16" per foot or less) which will allow time for personnel to place absorbents on a spill when it occurs. Recommend also that the Wildlife Management Area personnel procure some absorbents in readiness for a spill condition, storing them near the dispensing pumps in a position where they can be reached within a few seconds.

Location: 3 Locations on Site

General Comment/Recommendation: Three propane tanks at the Wildlife Management Area did not have warnings posted to prohibit smoking. **Recommend** that the tanks be labeled as to contents, and "No Smoking" signs be conspicuously posted.

Location: Mechanics Shop

General Comment/Recommendation: An unmarked sprayer was observed in the Mechanics Shop. **Recommend** that the sprayer be dedicated to the use of one material, and mark the sprayer accordingly for that material.

Location: Welding Shop

General Comment/Recommendation: An oxygen cylinder was observed to be not adequately secured to the structure or a cart at the Welding Shop. **Recommend** that the chain is tightened to secure the cylinder against falling.

Location: Gashouse

General Comment/Recommendation: Various fuels and chemicals are stored in the Gashouse. In the event of a fire, emergency personnel will need to know the hazards faced. **Recommend** that National Fire Protection Association (NFPA) signs be posted on or next to the access doors to assist these



emergency personnel. These signs should indicate the highest hazard levels contained in the building by placing the correct numbers in the *Health* (blue), *Flammability* (red), and *Reactivity* (yellow) diamonds.

CATEGORY VIII – SOLID WASTE MANAGEMENT

Location: Behind Paint Shed

General Comment/Recommendation: A huge collection of solid waste was building up behind the buildings. This collection is haphazardly placed, and is on the verge of becoming a non-permitted disposal area (junk-yard), with the wooded area growing up through the waste. **Recommend** that the solid waste be removed and taken to a licensed landfill (or recycling).

APPENDIX B – 2H

DETAILED FINDINGS & REMEDIES
ENVIRONMENTAL COMPLIANCE REVIEW
BLUESTONE LAKE
WEST VIRGINIA DIVISION OF NATURAL RESOURCES
WILDLIFE SECTION
REAL ESTATE DIVISION (OUTGRANT)

CATEGORY III – HAZARDOUS MATERIALS MANAGEMENT

Location: Fuel Storage Building

General Comment/Recommendation: At this location, gasoline and diesel products are dispensed into equipment and vehicles. Currently, the fuel dispensing takes place on a surface of gravel over earth. Overfills or inattention could result in spills which immediately contaminate the environment. **Recommend** that a fuel-dispensing pad be poured whenever funds permit. The surface of this pad should be liquid-tight, and sloped only gently (1/16" per foot or less) which will allow time for personnel to place absorbents on a spill when it occurs. Recommend also that the Wildlife Section personnel procure some absorbents in readiness for a spill condition, storing them near the dispensing pumps in a position where they can be reached within a few seconds.

Location: Gas House

General Comment/Recommendation: Material Safety Data Sheets (MSDS) were not present at the Gas House. Fuels and other chemicals are being stored or used at this area. **Recommend** that MSDS be obtained for every fuel and chemical on site, and posted conspicuously where the materials are used or stored.

Locations:

- 1) Storage Building
- 2) Well House

General Comment/Recommendation: The LP gas tanks were not labeled as to content and not marked prohibiting smoking. **Recommend** that the tanks be marked "Propane" and also "Flammable, No Smoking," or equivalent. The LP gas company servicing the tank should be able to supply decals, at Wildlife Section personnel's request, likely without charge.

CATEGORY VII – PETROLEUM, OIL, & LUBRICANT MANAGEMENT

Finding Number: BLN/06-07-001

Ranking: Minor

Location: Gas House

Comment: An observation of diesel fuel being stored in a kerosene container was made during the Assessment. Although this is not as dangerous a situation as gasoline being stored in a kerosene container (the result of which would be a Significant or Major finding), it could result in an injurious situation.

Recommendation: Recommend that all containers be marked properly, and the contents always be double-checked to ensure that the material contained is that which is stated on the label.

CATEGORY XII – WATER QUALITY MANAGEMENT

Location: Various locations at site

General Comment/Recommendation: In 2001, the ERGO team recommended that all threaded hose connections at the site be fitted with anti-siphon backflow preventers. Wildlife Section Management has decided to prohibit drinking of the water and use it only for non-potable purposes. This is an acceptable practice, but there are no warnings that the water is not potable. **Recommend** that all water points be labeled “Water Not Fit to Drink,” or equivalent.

APPENDIX E
DEED SEARCHES

<i>TRACT</i>	<i>GRANTOR</i>	<i>GRANTEE</i>	<i>D. B. / PG.</i>	<i>TRANSFER DATE</i>	<i>NOTES</i>
Map 11 par 158 0.6Ac	Ball, Ethel S. (widow); Ball, Thomas & Irene K. (h&w); Ball, Robert & Elizabeth (h&w); Meadows, Emma J. & Harvey S. (h&w); Ball, Benjamin (single); Ball, Jack G. (infant); Ball, James O. Jr & Mary Elizabeth (h&w).	State Road Commission	87/342	15-Oct-52	Portion of 8.63 Ac

<i>TRACT</i>	<i>GRANTOR</i>	<i>GRANTEE</i>	<i>D. B. / PG.</i>	<i>TRANSFER DATE</i>	<i>NOTES</i>
Map 11 par 150 0.90 Ac	Kirk, Maxine J (widow)	Kirk, Jerry P & Nannie K (h&w)	218/96	23-Mar-05	Portion of 3.56 Ac
	Kirk, John Robert (deceased)	Kirk, Maxine J (widow)	WB 20/629	19-Sep-03	
	Skaggs, Gordon H (deceased)	Kuhn, Mary A;	WB 9/398	18-Nov-79	
	WV DOH	Skaggs, Gordon H;	119/215	18-Jan-73	
	Ball, J.O. & Ethel (h&w)	WV DOH	66/120	5-Jan-35	

<i>TRACT</i>	<i>GRANTOR</i>	<i>GRANTEE</i>	<i>D. B. /PG.</i>	<i>TRANSFER DATE</i>	<i>NOTES</i>
Map 11 par 150.1 4.11 Ac	Ball, Ethel S. (widow); Ball, Thomas & Irene K. (h&w); Ball, Robert & Elizabeth (h&w); Meadows, Emma J. & Harvey S. (h&w); Ball, Jack G. (infant); Ball, James O. Jr & Mary Elizabeth (h&w).	Angotti, John & Wilma (h&w)	108/13	15-May-71	8/12 Interest
	WV DOH	Ball, Ethel S. (widow); Ball, Thomas & Irene K. (h&w); Ball, Robert & Elizabeth (h&w); Meadows, Emma J. & Harvey S. (h&w); Ball, Benjamin (single); Ball, Jack G. (infant); Ball, James O. Jr & Mary Elizabeth (h&w).	98/349	15-Oct-52	Quit Claim Deed
	Ball, J.O. & Ethel (h&w)	WV DOH	66/120	5-Jan-35	
	Kirk, Maxine J (widow)	Kirk, Jerry P & Nannie K (h&w)	218/96	23-Mar-05	3/12 Interest
	Kirk, John Robert (deceased)	Kirk, Maxine J (widow)	WB 20/629	19-Sep-03	
	Ball, Benjamin Harrison	Kirk, J. R.	107/744	24-Apr-71	Quit Claim Deed
	WV DOH	Ball, Ethel S. (widow); Ball, Thomas & Irene K. (h&w); Ball, Robert & Elizabeth (h&w); Meadows, Emma J. & Harvey S. (h&w); Ball, Benjamin (single); Ball, Jack G. (infant); Ball, James O. Jr & Mary Elizabeth (h&w).	98/349	15-Oct-52	Quit Claim Deed
	Ball, J.O. & Ethel (h&w)	WV DOH	66/120	5-Jan-35	
	Meadows, Mary Eleanor (deceased)	The Hinton First United Methodist Church	WB 24/254	19-Apr-09	1/12 Interest
	Skaggs, Gordon (deceased)	Meadows, Mary Eleanor	WB 9/398	18-Nov-79	
	Ball, Benjamin Harrison	Skaggs, Gordon	107/744	24-Apr-71	Quit Claim Deed
	WV DOH	Ball, Ethel S. (widow); Ball, Thomas & Irene K. (h&w); Ball, Robert & Elizabeth (h&w); Meadows, Emma J. & Harvey S. (h&w); Ball, Benjamin (single); Ball, Jack G. (infant); Ball, James O. Jr & Mary Elizabeth (h&w).	98/349	15-Oct-52	Quit Claim Deed
	Ball, J.O. & Ethel (h&w)	WV DOH	66/120	5-Jan-35	

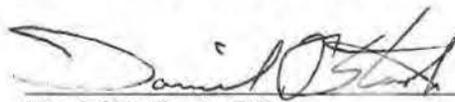
<i>TRACT</i>	<i>GRANTOR</i>	<i>GRANTEE</i>	<i>D. B. /PG.</i>	<i>TRANSFER DATE</i>	<i>NOTES</i>
Map 11 par 159 0.56 Ac	Skaggs, Gordon H (deceased)	Meadows, Mary Elizabeth	WB 9/398	18-Nov-79	1/2 Interest
	WV DOH	Skaggs, Gordon H; Kirk, John Robert	119/215	18-Jan-73	
	Lilly, V.T. & Ada Mae (h&w)	WV DOH	66/116	30-Jul-35	
	Kirk, Maxine J (widow)	Kirk, Jerry P & Nannie K (h&w)	218/96	23-Mar-05	1/2 Interest
	Kirk, John Robert (deceased)	Kirk, Maxine J (widow)	WB 20/629	19-Sep-03	
	WV DOH	Skaggs, Gordon H; Kirk, John Robert	119/215	18-Jan-73	
	Lilly, V.T. & Ada Mae (h&w)	WV DOH	66/116	30-Jul-35	

APPENDIX F
QUALITY CONTROL PLAN

Preparer of the Phase I Hazardous, Toxic, and Radioactive Waste Investigation Report on the Bluestone Dam DSMS Contractor Work Limits (CWL), Hinton, WV: Daniel F. Stark

Qualifications: See below.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

 31-MAY-2016
Daniel F. Stark, PG Date
Environmental Geologist

Environmental Professional in Responsible Charge: Daniel F. Stark, PG

Qualifications:

Relevant Education:

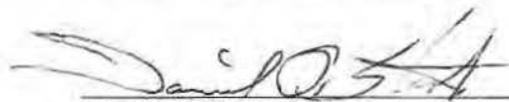
MS, 33 Semester hours – Environmental Science, WV College of Graduate Studies
1993-2001

BS, Geology, West Virginia University, 1979

Relevant Experience:

1996-present, Environmental Geologist, US Army Corps of Engineers – Perform environmental site assessments and plan and manage environmental investigation and remediation of residential and commercial sites.

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of this part.

 31-MAY-2016
Daniel F. Stark, PG Date
Environmental Geologist

**PROJECT SPECIFIC QUALITY CONTROL PLAN
BLUESTONE DAM DSMS CONTRACTOR WORK LIMITS
(CWL), HINTON, WV
PHASE I HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE
(HTRW) SITE INVESTIGATION**

I. Purpose.

This Quality Control Plan (QCP) presents the policy and specific actions that are being implemented on this program to insure that high quality products are produced on time and within budget. It defines the responsibilities and roles of each member on the Independent Quality Control Team. This QCP covers the review of Phase I HTRW Investigations prepared by the Environmental and Remediation Section (CELRH-EC-CE) and those prepared by an Architect-Engineer (A-E) consultant.

II. References.

- a. ER 1110-1-2 Engineering and Design Quality Management
- b. CELRDC 5-1-1 Quality Management Plan
- c. CELRHR 5-2-5 Quality Management Plan
- d. Work Instruction 3.36.2, Huntington district ISO standard for conducting Phase I Environmental Site Assessments, 28 March 2003
- e. EM 385-1-1 Safety and Health Requirements Manual
- f. ASTM E 1527-15 and E 1528-14, ASTM Standards on Environmental Site Assessments for Commercial Real Estate
- g. ER 1110-2-1150, Engineering and Design - Engineering and Design for Civil Works Projects, 31 August 1999.

III. General.

- A. Type of Project** – Phase I HTRW Environmental Site Assessment Report on Bluestone Dam DSMS Contractor Work Limits (CWL).
- B. Location** – Bluestone Dam, Miller Avenue, Hinton, WV.
- C. Customer/Sponsor** – The customer for this project is the U.S. Army Corps of Engineers.
- D. Project Description** – Assessment of all project lands that could be contaminated prior to conducting work on the site. A site assessment of all project lands shall include investigation of adjacent properties from which contamination could migrate. The Assessment shall consist of an environmental site assessment using standard practices to determine the potential for or presence of hazardous, toxic, or radioactive waste (HTRW) or other environmental concerns.

IV. Quality Control Plan.

An effective Quality Control Plan (QCP) is important to the undertaking of this program due to the potential risks that HTRW poses to human health and the environment. An effective QCP will ensure that a high quality technical product will be produced that will require little or no revision prior to a quality assurance review.

A qualified environmental professional from CELRH-EC-CE is responsible for compiling the Quality Control Plan. A QCP review team shall review this document.

V. Quality Control Process.

The Phase I HTRW Investigation shall be conducted by a functional team of qualified environmental professionals from CELRH-EC-CE with full communication between team members. The Lead Environmental Professional shall be responsible for coordination of the Phase I investigation and the development of the final report in accordance with standard practices, policies, and guidelines. The functional team will be responsible for ensuring a quality product is produced through internal checks, review and interaction with the Independent Quality Control Team (IQCT) members assigned to monitor project Quality.

The QCP shall apply to all tasks/activities and products (SSHP and Draft/Final reports) associated with this project. The Quality Control Plan was prepared according to [ER 1110-1-12 Change 2, Engineering and Design, Quality Management, 31 March 2011](#); LRD Regional Business Processes Manual: 08000 Engineering & Construction: 08504 LRD – QC/QA Procedures for Civil Works; 08504 LRH –QCP Work Instruction; and the applicable ISO processes developed for this type of work.

The QCP addresses all work information and activities required for the SSHP and Phase I HTRW Investigation. The plan addresses the responsibilities and roles of each member on the Independent QC Team (IQCT), along with those preparing or performing the tasks/activities for this project. Quality control shall be managed in compliance with required ISO procedures for quality control. USACE guidance documents and links to the ISO 9000 process can be found on the internet at the following address: <https://pmbpmanual.lrl.ds.usace.army.mil/qualtrax/>

The draft and final versions of the Phase I HTRW Report shall include a separate QC appendix that includes an activity review checklist (appropriate checks on those activities that were performed/reviewed) for the specific product along with a signed sheet which designates the name, date and official work title of the those persons performing/conducting the following activities: performance of activities/investigation, independent review of documents/reports, and approval of all work necessary to complete these activities. All comments and responses from USACE's QC review of the draft SSHP, QCP, and Phase I HTRW Report shall be included in the QC appendix of the final plans and reports.

VI. IQCT Review Team.

An IQCT will be assembled and will consist of experienced professionals knowledgeable of the technical requirements, customer needs, and schedule. Reviewers will be independent of the Functional Team. Members of the Environmental and Remediation Section or other district elements may serve as reviewers if they have not participated in report preparation.

Only quality products will be released from the IQCT review team. All members of the review team will sign a quality certification sheet.

VII. Quality Assurance.

A quality assurance (QA) review of the Phase I HTRW Investigations executed by CELRH-EC-CE will be conducted by the designated Quality Assurance team member.

Phase I HTRW Investigation Reports that are prepared by CELRH-EC-CE will be kept on file in the district office. Reports that contain questionable findings or recommendations for Phase II will be sent to the CELRN Environmental Restoration Design Center (ERDC) for QA review.

VIII. Resolution and Documentation.

The reviewers will provide a written record of comments for resolution. The functional team will respond to all comments and incorporate appropriate changes. Review comments and responses form an important record that completes the final product. Documentation of the independent review will be consistent, accurate, and a permanent part of the record.

IX. Checklist.

A checklist is included in Section XII of this plan and is intended to serve as a guide in checking or reviewing the Phase I HTRW Investigation Report. The checklist shall not substitute for sound judgment by reviewers.

X. QC Certification

The QC Certification will be completed on a project by project basis and placed in the project file.

XI. Project Schedule.

The Environmental & Remediation Section will follow the schedules as set by the Project Delivery Team (PDT) and Planning Division.

XII. QC Review Checklist

Project: Bluestone Dam DSMS Contractor Work Limits (CWL), Phase I HTRW
Environmental Site Assessment Report.

QC Reviewer: Janet K. Wolfe

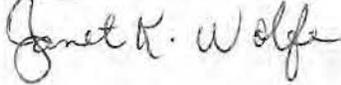
The following checklist is provided for QC review. Response "Y", "N", or "NA" should be marked in the space provided.

- | | |
|-------------------------------------|-----------------------|
| A. Introduction / Executive Summary | <u>Y</u> |
| B. Site Description | |
| 1. Background and Site History | <u>Y</u> |
| 2. USGS Topographic Map | <u>Y</u> |
| 3. Site Vicinity Map | <u>Y</u> |
| 4. Site Map | <u>Y</u> |
| C. Assessment Methodology | |
| 1. Environmental Screening | <u>NA</u> |
| 2. Deed Search | <u>Y</u> |
| 3. Aerial Photo's | <u>Y</u> |
| 4. Site Reconnaissance | <u>Y</u> |
| 5. Site Photo's | <u>Y</u> |
| 6. Ascertainable/Standard Sources | <u>Y</u> |
| 7. Safety Plan | <u>Y</u> |
| 8. Interviews | <u>Y</u> |
| 9. Data Review | <u>Y</u> |
| 10. Conformance to ASTM Standards | <u>Y</u> |
| D. Summary of Findings | <u>Y</u> |
| E. Conclusions | <u>Y</u> |
| F. Exposure Assessment | <u>NA</u> |
| G. Recommendations | |
| 1. Other Actions | <u>Y</u>
<u>NA</u> |
| H. Appendices | |
| 1. Site Maps | <u>Y</u> |
| 2. Interview Records | <u>Y</u> |
| 3. Photo documentation | <u>Y</u> |
| 4. Environmental Screening Data | <u>Y</u> |

XIII. Quality Certification Document

This is to certify that the Lead Environmental Professional and the IQCT members have reviewed the attached document in accordance with the Quality Control Plan. All comments resulting from the various reviews have been resolved and incorporated.

Internal Quality Control Team

	NAME	SIGNATURE	DATE
LEP:	Daniel F. Stark		23-June-2016
	IQCT: Janet K. Wolfe		23-June 2016



MEMORANDUM FOR CELRH-EC-CE, ATTN: Dan Stark

SUBJECT: Comments on the Draft Phase I Environmental Site Assessment, Bluestone Dam, Contractor Work Limits (CWL), Dam Safety Modification Study, June 2016

1. Comments on the above referenced document are included below.
2. General Comment: I noticed you have Roman Numerals for page numbers rather than Arabic Numerals (i.e., 1, 2, 3, etc.). Just checking to see if this is intentional.
3. Section 1, Introduction, line 3. Clarify "this study". Are you referring to the DSMS or the Phase I ESA? In line 5, clarify "this area". Are you referring to the stilling basin?
4. Section 1.4.3, Records of State & Fed Agencies, page xi – 1st full paragraph. Information you have here about "these 2 sites" that "could not be plotted" could be referenced in Section 1.4.8, Orphan Sites.
5. Section 1.4.4, Ownership History. Tract maps for the non-federal properties should be included. What type of activities was conducted on the property by DOH? Did they store explosives for blasting activities in road construction? Any gas, oil, chemicals, maintenance products, etc. stored at this location during DOH use?
6. Section 1.4.5, Other Phase I HTRW Reports. Provide a clearer reference to the previous HTRW Report. Include the date and name of the report.
7. Section 1.4.6. CELRH Operations Division has files for old ERGO Reports. Operations Division also has UST files. Have you checked the ERGO files to see if there are ERGO Reports preceding the August 2006 ERGO Report? Operations' UST files should have a record of the UST Closures. The records could show if any soil was remediated and if Closure was deemed complete by WVDEP.
8. Section 2, Investigative Findings, 2nd line, page xiii. Re: "this study". Same comment as No. 3 above.
9. Section 2.1, CWL Area. Tract maps for the non-federal properties should be included. The locations of these tracts should also be shown on Figure 3.
10. Section 2.1.1, Phase I Investigation Results, page xiv. You could include Parcel Numbers for each of the property owners in the bulleted list.
11. Section 3, References. Correct the typo. ASTM 1527-135 should be corrected to ASTM 1527-13.
12. Appendix A, Project Mapping. Tract maps of the non-federal properties should be included in the report. The drawing (Figure 3) of the CWLs in Appendix A should be revised to include the location of the non-federal properties.

13. Appendix D, ERGO Report. For clarity, you could include a statement in the body of the ESA report that indicates that none of the outgranted facilities (i.e., AEP flyash disposal area, raw water pumping station, etc.) listed on pg 1 of the Bluestone Lake Cycle IV Environmental Compliance Review are located within the CWLs.

14. Appendix D, ERGO Report. In Category VIII – Solid Waste Management, there is mention of a scrap yard. Is this storage/disposal area located within the CWLs? If so, provide a current status of the scrap yard.

15. Appendix D, ERGO Report. In Category XI – Waste Water Management, there is mention of a lift station. Is this storage/disposal area located within the CWLs?

16 Appendix F. Quality Control Plan, Section V, Quality Control Process. The references should be checked and updated if necessary. The following are helpful suggestions:

- a. I couldn't find those same documents you referenced in Section V your QCP when I recently updated the QCP for one of my recent projects. I finally made a reference to the following in Qualtrax: "LRD Regional Business Processes Manual: Quality Management System Operational Process".
- b. I've checked Qualtrax again. Under the LRD Regional Business Processes Manual, there are the following subsections under 08000 Engineering & Construction: 08504 LRD – QC/QA Procedures for Civil Works; 08504 LRH –QCP Work Instruction.
- c. The section 08504 LRD - QC/QA Procedures for Civil Works has a reference to [ER 1110-1-12 Change 2. Engineering and Design, Quality Management, 31 March 2011.](#)
- d. We can check Qualtrax further to see if there are other references that should be included. I've also suggested that it would be good if additional guidance/training be provided to our section on this.

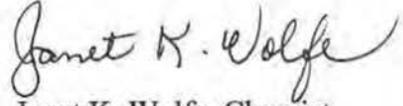
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18. Appendix F. Quality Control Plan. Section XII, QC Review Checklist. The name of the project needs to be changed to Bluestone.

19. Appendix I, Color Photographs. Recommend that the CWL drawing (Figure 3 in Appendix A) include the location of some or all of the following that is shown in the photos:

- Contractor warehouse (photo 10)
- Contractor concrete plant (photo 11)
- Contractor Spoil Site (photo 12)
- Contractor Petroleum Area (photo 13)
- Diesel AST (15)
- Contractor's trailer office (photo 19)
- Contractor's yard & easement (photo 20)
- LRH Operations office/warehouse (photos 23 & 24).

20. If you have any questions, let me know.

A handwritten signature in black ink that reads "Janet K. Wolfe". The signature is written in a cursive style with a large initial 'J' and a long, sweeping tail.

Janet K. Wolfe, Chemist
Environmental and Remediation Section

MEMORANDUM FOR CELRH-EC-CE, ATTN: Janet Wolfe

SUBJECT: Response to Comments on the Draft Phase I Environmental Site Assessment, Bluestone Dam, Contractor Work Limits (CWL), Dam Safety Modification Study, June 2016

1. Response to your comments on the above referenced document are included below.
2. General Comment: I noticed you have Roman Numerals for page numbers rather than Arabic Numerals (i.e., 1, 2, 3, etc.). Just checking to see if this is intentional.
Response: This document will be an Appendix to an EIS. Roman Numerals were intentionally utilized to differentiate from main EIS report.
3. Section 1, Introduction, line 3. Clarify “this study”. Are you referring to the DSMS or the Phase I ESA? In line 5, clarify “this area”. Are your referring to the stilling basin?
Response: “This study” refers to the DSMS, and has been clarified. “This area” refers to the CWL, and has been clarified.
4. Section 1.4.3, Records of State & Fed Agencies, page xi – 1st full paragraph. Information you have here about “these 2 sites” that “could not be plotted” could be referenced in Section 1.4.8, Orphan Sites.
Response: Concur. Sites have been discussed in Section 1.4.8.
5. Section 1.4.4, Ownership History. Tract maps for the non-federal properties should be included. What type of activities was conducted on the property by DOH? Did they store explosives for blasting activities in road construction? Any gas, oil, chemicals, maintenance products, etc. stored at this location during DOH use?
Response: Concur. Tract map showing the non-federal properties is included in Appendix A as Figure 4. As stated in the report, the DOH utilized the property to relocate State Route 20; any property not required for the right-of-way of State Route 20 was sold. The relocation of the roadway was performed in the 1940’s; records indicating storage of explosives, gas, oil, and chemicals would not be specific.
6. Section 1.4.5, Other Phase I HTRW Reports. Provide a clearer reference to the previous HTRW Report. Include the date and name of the report.
Response: Concur. The date of the older Phase I HTRW Report has been included. A copy of the report is not available, so the name of the report has not been included.
7. Section 1.4.6. CELRH Operations Division has files for old ERGO Reports. Operations Division also has UST files. Have you checked the ERGO files to see if there are ERGO Reports preceding the August 2006 ERGO Report? Operations’ UST files should have a record of the UST Closures. The records could show if any soil was remediated and if Closure was deemed complete by WVDEP.
Response: The ERGO report gives a snapshot of the compliance of the project with all Federal, State, and local environmental laws. The 2006 report indicated no current impact of the UST removal. Discussion with Dean Bonifacio, who was present during the UST removal in 1992

and the 2006 ERGO review, indicated that there was no environmental impact related to the USTs. The UST files were not acquired for the report.

8. Section 2, Investigative Findings, 2nd line, page xiii. Re: “this study”. Same comment as No. 3 above.

Response: Concur. “This study” has been clarified.

9. Section 2.1, CWL Area. Tract maps for the non-federal properties should be included. The locations of these tracts should also be shown on Figure 3.

10. Section 2.1.1, Phase I Investigation Results, page xiv. You could include Parcel Numbers for each of the property owners in the bulleted list.

Response: Concur. Parcel numbers have been included.

11. Section 3, References. Correct the typo. ASTM 1527-135 should be corrected to ASTM 1527-13.

Response: Concur. Corrected.

12. Appendix A, Project Mapping. Tract maps of the non-federal properties should be included in the report. The drawing (Figure 3) of the CWLs in Appendix A should be revised to include the location of the non-federal properties.

Response: Concur. Tracts of non-federal properties were annotated on Figure 3.

13. Appendix D, ERGO Report. For clarity, you could include a statement in the body of the ESA report that indicates that none of the outgranted facilities (i.e., AEP flyash disposal area, raw water pumping station, etc.) listed on pg 1 of the Bluestone Lake Cycle IV Environmental Compliance Review are located within the CWLs.

Response: Concur. Language included indicating that the outgranted facilities are not located in the CWL.

14. Appendix D, ERGO Report. In Category VIII – Solid Waste Management, there is mention of a scrap yard. Is this storage/disposal area located within the CWLs? If so, provide a current status of the scrap yard.

Response: Concur. The scrap yard was located outside of the CWL and has been removed.

Language referencing this scrap yard has been included.

15. Appendix D, ERGO Report. In Category XI – Waste Water Management, there is mention of a lift station. Is this storage/disposal area located within the CWLs?

Response: The location of the lift station is noted in the ERGO report and is not included in the CWL.

16 Appendix F. Quality Control Plan, Section V, Quality Control Process. The references should be checked and updated if necessary. The following are helpful suggestions:

- a. I couldn't find those same documents you referenced in Section V your QCP when I recently updated the QCP for one of my recent projects. I finally made a reference to the following in Qualtrax: “LRD Regional Business Processes Manual: Quality Management System Operational Process”.

- b. I've checked Qualtrax again. Under the LRD Regional Business Processes Manual, there are the following subsections under 08000 Engineering & Construction: 08504 LRD – QC/QA Procedures for Civil Works; 08504 LRH –QCP Work Instruction.
- c. The section 08504 LRD - QC/QA Procedures for Civil Works has a reference to [ER 1110-1-12 Change 2, Engineering and Design, Quality Management, 31 March 2011](#).
- d. We can check Qualtrax further to see if there are other references that should be included. I've also suggested that it would be good if additional guidance/training be provided to our section on this.

Response: Concur. References have been updated.

17. Appendix F. Quality Control Plan. Section V, Quality Control Process. The link to MYCO in the 3rd paragraph would not open. This may be a website that has changed.

Response: Concur. Link has been updated.

18. Appendix F. Quality Control Plan. Section XII, QC Review Checklist. The name of the project needs to be changed to Bluestone.

Response: Concur. Name of project changed to Bluestone.

19. Appendix I, Color Photographs. Recommend that the CWL drawing (Figure 3 in Appendix A) include the location of some or all of the following that is shown in the photos:

- Contractor warehouse (photo 10)
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- Diesel AST (15)
- Contractor's trailer office (photo 19)
- Contractor's yard & easement (photo 20)
- LRH Operations office/warehouse (photos 23 & 24).

Response: Concur. The above locations were annotated on Figure 3.

20. If you have any questions, let me know.

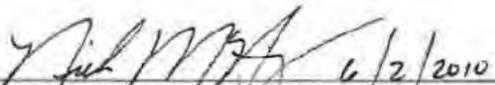


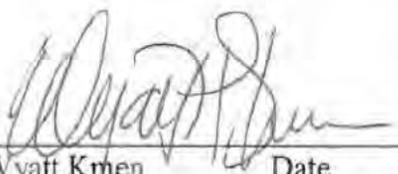
Daniel F. Stark, Environmental Geologist
Environmental and Remediation Section

APPENDIX G
SITE SAFETY AND HEALTH PLAN

**GENERIC
SITE SAFETY AND HEALTH PLAN
FOR
PHASE I HTRW ENVIRONMENTAL SITE ASSESSMENTS**

Prepared by:
U.S. Army Corps of Engineers
Huntington District
502 8th Street
Huntington, West Virginia 25701-2070

Prepared by:  6/2/2010
Nickolas McHenry, *EP* Date
Environmental Engineer
Environmental and Remediation Section

Reviewed by:  10/19/10
Wyatt Kmen Date
Chief
Environmental and Remediation Section

Approved by:  10/19/10
Shreda Gorum Date
Safety & Occupational Specialist
Safety Office

1.0 INTRODUCTION

1.1 Purpose. The purpose of this Site Safety and Health Plan (SSHP) is to establish personnel protection standards, mandatory safety practices, and procedures for all work conducted in the execution of Phase I HTRW Investigations and Asbestos Inspections. The plan assigns responsibilities, establishes standard operating procedures, and provides emergency procedures while operations are being conducted during these field activities. This SSHP is designed to comply with the USACE Safety and Health Requirements Manual, EM 385-1-1, 03 November 2003.

1.2 Policy. The provisions set forth in this SSHP are mandatory for all personnel who perform or assist in the conduct of this work. All personnel must become familiarized with the requirements of this SSHP prior to performance of any Phase I HTRW Investigation or Asbestos inspection. The SSHP shall be amended to be site-specific, i.e., show local hospital route, site locations, etc., prior to each new field activity.

2.0 SITE DESCRIPTION AND CONTAMINATION CHARACTERISTICS

2.1 General. Sites to be investigated will include residential or commercial properties, civil works sites, former manufacturing facilities, military sites, or work for others sites.

2.2 Contamination Characteristics. Investigations and inspections at sites other than typical residential or commercial (non-industrial) shall be performed with extreme caution due to the unknown nature of the contaminants. Contamination may range from minor petroleum contamination (fuel spills, motor oil) or improperly disposed household wastes, to more toxic wastes such as PCBs, heavy metals, dioxins, volatiles, and ordnance. Prior to the site visit, the inspection team shall assess the hazardous and toxic contamination potential for the site and amend this SSHP, as appropriate. It is noted that intrusive sampling, other than sampling for asbestos containing materials (ACM), is beyond the scope of Phase I HTRW Investigations.

Each site shall be thoroughly inspected for any evidence of HTRW contamination in accordance with the requirements of ASTM E 1527-05 and ASTM E 1528-00. Structures shall be inspected for potential ACM and samples taken and analyzed in accordance with USEPA guidance for this work. The site shall be thoroughly walked over and inspected for any signs of contamination, such as distressed vegetation, partially buried drums, excavation or fill activities, underground storage tanks, soil staining, etc.

3.0 HAZARD/RISK ANALYSIS

3.1 Chemical Hazards. Inspectors could be exposed to a variety of contaminants; however, due to the non-intrusive nature of a Phase I investigation, the likelihood for exposure is very minimal. Inspectors shall not open any drums or underground storage tanks (USTs), nor

disturb any other areas of suspect contamination. If a hazardous or toxic condition is evident or suspected, the team shall immediately cease the investigation and notify the Chief, Environmental and Remediation Section. Re-entry to the site shall not be permitted until the situation has been thoroughly investigated.

ACM inspectors shall reduce the risk of exposure to these materials with the use of safe sampling procedures. Inspectors shall wear appropriate respiratory protection if the suspect material appears to be friable. Friable sampling areas shall be wetted prior to sampling and immediately sealed with a clear lacquer or other encapsulating material following the sampling activity.

3.2 Accident Prevention. The most significant hazards expected to be encountered while performing these investigations will be slip, trips, falls, and cuts. These hazards are prevalent due to uneven terrain, weather conditions (rain or snow), dilapidated structures, unstable refuse piles, etc. The use of protective gloves and appropriate footwear will minimize these hazards. Inspectors must remain aware of these hazards at all times and shall employ use of the "buddy system" when performing these inspections to reduce the possibility of injury. Inspectors shall also use sound judgment when inspecting a site and shall cease the inspection immediately when human health and safety is jeopardized. Obviously hazardous areas, such as structures with rotten floors, open tanks and drums, confined space entry, etc., will be avoided.

Execution of these field activities will be conducted during both hot and cold temperatures, as well as during inclement weather. Investigators shall take such precautions as wearing rain suits, layering clothing for cold weather, or wearing loose-fitting clothing during hot weather. Since these activities are not particularly physically taxing, workers should not experience heat or cold stress. Frequent breaks in the shade or in a warm vehicle will be possible, as well as replenishing oneself with cold or warm fluids as applicable.

Other hazards to be aware of are biological hazards, such as bees, ticks, snakes, etc., as well as vicious animals. Fieldwork shall be abandoned when any of these hazards are present and shall not resume until safe site entry can be made.

3.3 Vehicle Operation. Field personnel may require the use of a motor vehicle. All vehicles shall be operated in accordance with EM 385-1-1, 18.B. Key points from the Corps safety manual are:

- Operators shall exercise defensive driving techniques.
- Seat belts shall be worn by all occupants.
- The operator shall have the vehicle under control at all times.
- Vehicles shall be driven at speeds not greater than the posted legal speed limit, weather permitting.
- Vehicles shall not be left unattended until the motor has been shut off and the key removed from the ignition.
- Headlights shall be used from sunset until sunrise and during times of adverse weather or sight conditions.

- All equipment shall be properly secured.
- Vehicle shall be maintained in good working order.
- Personnel shall be clear of traffic when exiting the vehicle.

Special considerations need to be taken for off-road usage of vehicles. Off-road areas include but are not limited to trails, tracks, and haul roads and the following precautions shall be exercised:

- Reduce speed on trails, tracks, and haul roads compared to similarly-constructed civil roads.
- Trails, tracks, and haul roads are not built to highway standards for width and sight distance, so be alert for other vehicles.
- Intersections of trails, tracks, or haul roads must be considered high-risk areas - proceed with extreme caution.
- Cross-country driving is discouraged unless a ground guide is leading the vehicle on foot.
- Grades greater than 10% shall not be driven on.

If all-terrain vehicles (ATVs) or utility vehicles are used, the requirements of EM 385-1-1 Section 18.D or Section 18.F, respectively, must be followed.

4.0 STAFF ORGANIZATION, QUALIFICATIONS AND RESPONSIBILITIES

4.1 Staff Organization. The Corps inspection team shall consist of two field workers, environmental engineers or engineering technicians. If ACM sampling is required, one team member shall be certified to conduct this work. Each individual shall be responsible as a site safety and health officer due to the minimal hazards associated with this work. Key personnel for this work include the following:

Environmental Engineers	Frank Albert, P.E. Lisa Humphreys
Chemist	Janet Wolfe Jason Ritter
Geologist	Daniel Stark, P.G.
Engineering Technician	Jo Huff (Asbestos)

Additional personnel may be essential to these work activities, as approved by the Chief, Environmental and Remediation Section.

4.1.1 Section Chief's Responsibilities. For job-related injuries which require medical treatment, the Section chief shall accompany the injured employee to the medical treatment facility and explain the employee's regular duties and the availability of "Light Duty" so that the injured employee can return to work as soon as medically possible.

4.1.2 Employee's Responsibilities. Employees shall be required to read this SSHP and comply with all aspects contained herein. Employees shall not endeavor to conduct these investigations without use of the "buddy system". Employees shall immediately notify the Chief, Environmental and Remediation Section, of any hazardous or potentially hazardous incident or working situation. Employees shall comply with all property owners' security or clearance requirements. Finally, employees shall comply with a property owner's request to vacate the premises, if so directed, and shall immediately apprise the Chief, Environmental and Remediation Section, of this situation.

4.1.3 Reporting and Investigation. All accidents shall be reported as soon as possible to the Section Chief. The Branch Collateral Duty Safety Officer shall investigate the accident and recommend any corrective actions on ENG Form 3394, furnished to the Safety Office within 2 working days following the accident.

4.2 Training. All investigators have been trained for HTRW work in accordance with 29 CFR 1910.120(e) and receive an annual eight-hour refresher course in hazardous waste site operations. This training meets the requirements of EM 385-1-1, 28.D. All personnel have received Red Cross-sponsored first aid and CPR training and are qualified to administer minor first aid treatment, which is considered adequate for these investigations. Training documentation is on file at the District office. Additionally, all personnel have received site-specific training as required in EM 385-1-1, 28.D.03. Inspectors involved in sampling suspect ACM have received USEPA-sponsored training that meets the requirements of 40 CFR Part 763 AHERA for purposes of accreditation required under Toxic Substances Control Act (TSCA) Section 206. Asbestos inspectors shall also receive an annual training refresher and license renewal.

5.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

5.1 General. All personnel have been issued their own PPE and received training in the proper use of this equipment. Regular inspections of this equipment are the individual's responsibility. Any defective equipment shall be reported immediately to the Section Chief so that a replacement can be issued. All PPE meets or exceeds the appropriate ANSI standard.

5.2 Protection Requirements. The level of protection for these investigations should be Level D. No personnel shall enter a site or situation that requires protection above this level. The minimum requirements for Level D protection are sleeved (long or short) shirts, long trouser pants, and steel-toed safety shoes or boots. Personnel may be required to wear safety glasses with side shields, a hard hat, or protective gloves depending on the work situation (sampling asbestos, entering crawl spaces, etc.). All employees receive regular medical exams to assure that they are physically fit to conduct hazardous waste site investigations in accordance with EM 385-1-1, 05.E. and 29 CFR 1910.120.

6.0 MEDICAL SURVEILLANCE

6.1 General. All employees engaged in HTRW activities are required to enter the District's medical surveillance program, which is executed by the Safety and Occupational Health Office. The program is conducted in accordance with EM 385-1-1, Appendix K and 29 CFR 1910.120 and its appendices. The Safety Office contracts with licensed Occupational Health physicians who are knowledgeable of the physical requirements for hazardous waste site workers.

A baseline physical exam and assessment are conducted to assure that the employee is physically fit to perform the duties required in hazardous waste site operations. This initial exam includes a complete physical examination of major vital organs, chest x-ray, EKG, complete blood workup, audiogram and pulmonary function tests. The examining physician then furnishes the Safety Office a certification of the employee's ability to perform this work or any restrictions that should be imposed.

Annual exams are then conducted which consist of the physical exam, blood work, audiogram, and pulmonary function tests. A chest x-ray and EKG are conducted every third year, or at the discretion of the Safety Office or examining physician. The District Safety Office maintains the medical files for all hazardous waste site workers for a period of 30 years following employment with the Government.. Additional, non-scheduled examinations shall be conducted, given the following conditions:

- After an employee has been subjected to a known acute exposure of a hazardous or toxic material.
- After an employee has been subjected to a potential acute exposure of a hazardous or toxic material.
- At the request of an employee who feels that he or she has the symptoms of an acute exposure.
- Prior to an employee's return to work following extended absence due to work-related injury or illness.

7.0 MONITORING

7.1 Air Monitoring. Due to the non-intrusive nature of these investigations, air monitoring should not be required. Employees shall avoid areas that may be suspect for collection of toxic vapors such as manholes, confined spaces, etc. Sampling for ACM shall be conducted in a controlled manner to eliminate air borne particulates. Employees shall use a respirator as required to conduct this work and shall not allow unprotected field personnel or the public within any exposure areas. Employees using respirators must have annual respirator training.

7.2 Heat/Cold Stress Monitoring. Due to the short term nature of these field investigations, heat or cold stress related problems should not occur. Employees should be able to perform their limited field activities and then seek comfort within a heated or air conditioned

vehicle, in shady areas, in a nearby building, etc.

8.0 STANDARD SAFETY PROCEDURES

Standard safety procedures for these HTRW/ACM activities include the following:

- Employees shall always use the "buddy system".
- Employees shall never open or tamper with drums, containers, USTs, or any other potential sources of hazardous and toxic substances.
- Employees shall use sound judgment when entering potentially dangerous situations, i.e., dilapidated structures, properties with vicious dogs, etc. If any of these situations arise, the investigation shall cease until safe site entry can be made.

9.0 SITE CONTROL

These investigations will be conducted on private, public, and Government property. Site control will not be under the control of the field personnel on public or private property. Personnel shall be required to maintain control within the vicinity of ACM sampling activities, however, to protect other field workers and the public.

10.0 PERSONAL HYGIENE AND DECONTAMINATION

Personnel shall adhere to the standard safety procedures noted in Section 8.0 and avoid contact with any potentially hazardous or toxic substances. If contact is made with minor contaminants, such as petroleum products, normal washing with soap and water should be adequate. Should contact be made with caustic or acidic substances, the exposed area shall be flushed with water for 15 minutes and the injured worker rushed to the local hospital or other medical facility.

Workers involved with sampling of ACM shall take care to avoid contact with any particulates. If exposure occurs, the affected area shall be washed with soap and water to remove any contamination.

Workers shall always practice good hygiene and be sure to wash their hands prior to eating, drinking, or smoking. They shall also thoroughly wash their face, hands, and any other exposed areas following the conduct of daily field activities.

11.0 EQUIPMENT DECONTAMINATION

The equipment necessary to conduct these field activities includes a camera and asbestos sampling tools. Decontamination of the asbestos sampling tools shall be accomplished by wiping the tool clean after each sampling activity to avoid any cross-contamination between samples. Wiping cloths shall be double-bagged and disposed of in a sanitary landfill.

12.0 EMERGENCY EQUIPMENT AND FIRST AID

All employees engaged in these activities have received Red Cross-sponsored training in minor first aid and CPR. Since the "buddy system" shall be employed during these activities, the requirement in EM 385-1-1 to have two employees on the site certified in first aid and CPR shall be met. The Government vehicle shall be equipped with a first aid kit to treat minor injuries. The first aid kit shall be restocked prior to each field investigation and checked to assure that the contents have remained sterile.

13.0 EMERGENCY RESPONSE

13.1 General. If an emergency arises that involves a major personal injury, fire, or other threat to the surrounding area, local emergency responders shall be contacted. Since these activities may be conducted in remote locations, employees must become familiar with the location of the closest medical facility and the most direct route to that facility.

13.2 Emergency Contacts:

Ambulance	911
Fire and/or Sheriff	911
Summers County ARH 1500 Terrace St, Hinton, WV	(304) 466-1000

13.3 Directions to Hospital:

1. Head **north** on **Miller Ave.** 0.5 mi
2. Turn **right** onto **WV-3/Greenbrier Drive** 1.3 mi
3. Turn **right** onto **Terrace Street** 0.1 mi
4. Destination will be on the **left**.

APPENDIX A
JOB HAZARD ANALYSIS

**JOB HAZARD ANALYSIS
FOR
PHASE I HTRW INVESTIGATIONS & ASBESTOS INSPECTIONS**

ACTIVITY	HAZARD	REMEDY
<i>Vehicle operation</i>	<ol style="list-style-type: none"> 1. Inclement weather or visibility hazards. 2. Medication or other drowsiness. 3. Other drivers and traffic. 	<ol style="list-style-type: none"> 1. Always wear seat belts; use headlights from dusk to dawn or in fog; obey posted speed limit; slow down as appropriate; apply 2 second rule. 2. Never operate a vehicle if medication causes drowsiness; never drive if you are sleepy or otherwise impaired. 3. Use defensive driving techniques; park your vehicle clear from traffic.
<i>Phase I HTRW Inspection</i>	<ol style="list-style-type: none"> 1. Slip, trip and fall 2. Unknown HTRW 3. Confined spaces 4. Biological and physical hazards 	<ol style="list-style-type: none"> 1. Assure firm footing; do not climb unstable slopes; wear protective footwear. 2. Never open drums, containers or underground storage tanks for these investigations. 3. Never enter confined spaces for these investigations. 4. Use tick or insect repellent; do not enter sites with vicious animals.
<i>Asbestos sampling</i>	<ol style="list-style-type: none"> 1. Airborne particulates. 2. Cuts or abrasions. 3. Sample cross-contamination. 	<ol style="list-style-type: none"> 1. Adequately wet the sample area prior to sampling; wear respiratory protection as required. 2. Wear protective leather gloves; always use a sharp sampling tool. 3. Thoroughly wipe sampling tools after each sampling activity.

701 Miller Ave

Hinton, WV 25951

-  1. Head north on Miller Ave toward Rose St 0.5 mi
-  2. Turn right onto WV-3 E/Greenbrier Dr 1.3 mi
-  3. Turn right onto Terrace St 0.1 mi
 -  Destination will be on the left

Summers County ARH Hospital

1500 Terrace Street, Hinton, WV 25951

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.



Map data ©2016 Google 1000 ft

701 Miller Ave

Hinton, WV 25951

- ↑ 1. Head north on Miller Ave toward Rose St
- 2. Turn right onto WV-3 E/Greenbrier Dr
- 3. Turn right onto Terrace St
i Destination will be on the left

0.5 mi

1.3 mi

0.1 mi

Summers County ARH Hospital

1500 Terrace Street, Hinton, WV 25951

APPENDIX H
INTERVIEWS

CONVERSATION RECORD

TIME
1330

DATE
20-April-2016

TYPE

VISIT

CONFERENCE

TELEPHONE

INCOMING
 OUTGOING

ROUTING

NAME/SYMBOL	INT

Location of Visit / Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU

ORGANIZATION (Office, dept., bureau,

TELEPHONE NO.

Dean Bonifacio, Park Manager

CELRH-OR-BLN

304-466-1234

SUBJECT

Environmental Concerns - Bluestone Dam

SUMMARY

Dean Bonifacio, Bluestone Park Manager, has worked at Bluestone Dam since 1990. Dean stated that they removed the three USTs at their maintenance office in 1992. At the time of removal, no evidence of contamination was present in the tank pits; confirmation samples were taken and they came back clean. A 250 gallon diesel tank is present inside the dam structure for the emergency generator. The tank is double-walled, and there has been no diesel spills. Dean stated that the past, or ongoing, Phased construction Contractors have not environmentally impacted the areas that comprise the proposed CWL for Phase 5.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION

SIGNATURE

DATE

Daniel F. Stark



20-April-2016

ACTION TAKEN

SIGNATURE

TITLE

DATE

CONVERSATION RECORD

TIME 13:00

DATE 24-March-2016

TYPE

VISIT

CONFERENCE

TELEPHONE

INCOMING
 OUTGOING

ROUTING

NAME/SYMBOL INT

Location of Visit / Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU
Whitfield Lance

ORGANIZATION (Office, dept., bureau,
CELRH-EC-C-BLN

TELEPHONE NO.
304-466-6950

SUBJECT

Environmental Concerns - Bluestone Dam

SUMMARY

Whitfield Lance has been a Construction Inspector at Bluestone Dam for 19 years. During his tenure, there has been no incidents at, or in close proximity to the Bluestone Dam that would environmentally impact the Project. As a requirement of the construction Contractors during Phase 1 through Phase 4, they were/are obligated to apprise the RE Office of any environmental incidents that would impact the site and remediate the concern according to State and Federal regulations. The Contractors were/are required to verify that the CWLs have no environmental concerns after their construction contracts are finished.

ACTION REQUIRED

None.

NAME OF PERSON DOCUMENTING CONVERSATION

Daniel F. Stark

SIGNATURE



DATE

25-March-2016

ACTION TAKEN

SIGNATURE

TITLE

DATE

APPENDIX I
COLOR PHOTOGRAPHS



**Photo BLN01 – CWL Behind Dam
24 March 2016**



**Photo BLN02 – Left Descending Bank Behind Dam
24 March 2016**



**Photo BLN03 – Access Road to Corps Dock & Boat Launch Ramp
24 March 2016**



**Photo BLN04 – Corps Dock and Boat Launch Ramp
24 March 2016**



**Photo BLN05 – Wide Area#1 Between State Route 20 and Lake
24 March 2016**



**Photo BLN06 – Wide Area#2 Between State Route 20 and Lake
24 March 2016**



**Photo BLN07 – Phase 3 CWL Downstream Right Bank
24 March 2016**



**Photo BLN08 – Phase 3 CWL Adjacent to Dam and Emergency Stilling Basin
Downstream Right Bank
24 March 2016**



**Photo BLN09 – Phase 3 CWL Downstream of Emergency Stilling Basin Right Bank
24 March 2016**



**Photo BLN10 – Phase 3 Contractor's Warehouse Downstream Right Bank
24 March 2016**



**Photo BLN11 – Phase 3 Contractor’s Concrete Plant Downstream Right Bank
24 March 2016**



**Photo BLN12 – Phase 3 Contractor’s Spoil Site Downstream Right Bank
24 March 2016**



**Photo BLN13 – Phase 3 Contractor’s Petroleum Containment Area
Downstream Right Bank
24 March 2016**



**Photo BLN14 – Phase 3 Contractor’s Petroleum Containment Area
Downstream Right Bank
24 March 2016**



**Photo BLN15 – Phase 3 Contractor Diesel AST Adjacent to Emergency Stilling Basin Downstream Right Bank
24 March 2016**



**Photo BLN16 – Phase 3 Contractor Diesel AST Adjacent to Emergency Stilling Basin Downstream Right Bank
24 March 2016**



**Photo BLN17 – Phase 4 CWL Adjacent to Dam Left Bank and Stilling Basin
24 March 2016**



**Photo BLN18 – Public Fishing Pier Left Bank and Stilling Basin
24 March 2016**



**BLN19 – Phase 4 Contractor’s Trailer Office on Easement
Downstream Left Bank
18 May 2016**



**BLN20 – Phase 4 Contractor’s Yard and Warehouse on Easement
Downstream Left Bank
18 May 2016**



**BLN21 – Phase 4 Contractor’s Easement
Downstream Left Bank
18 May 2016**



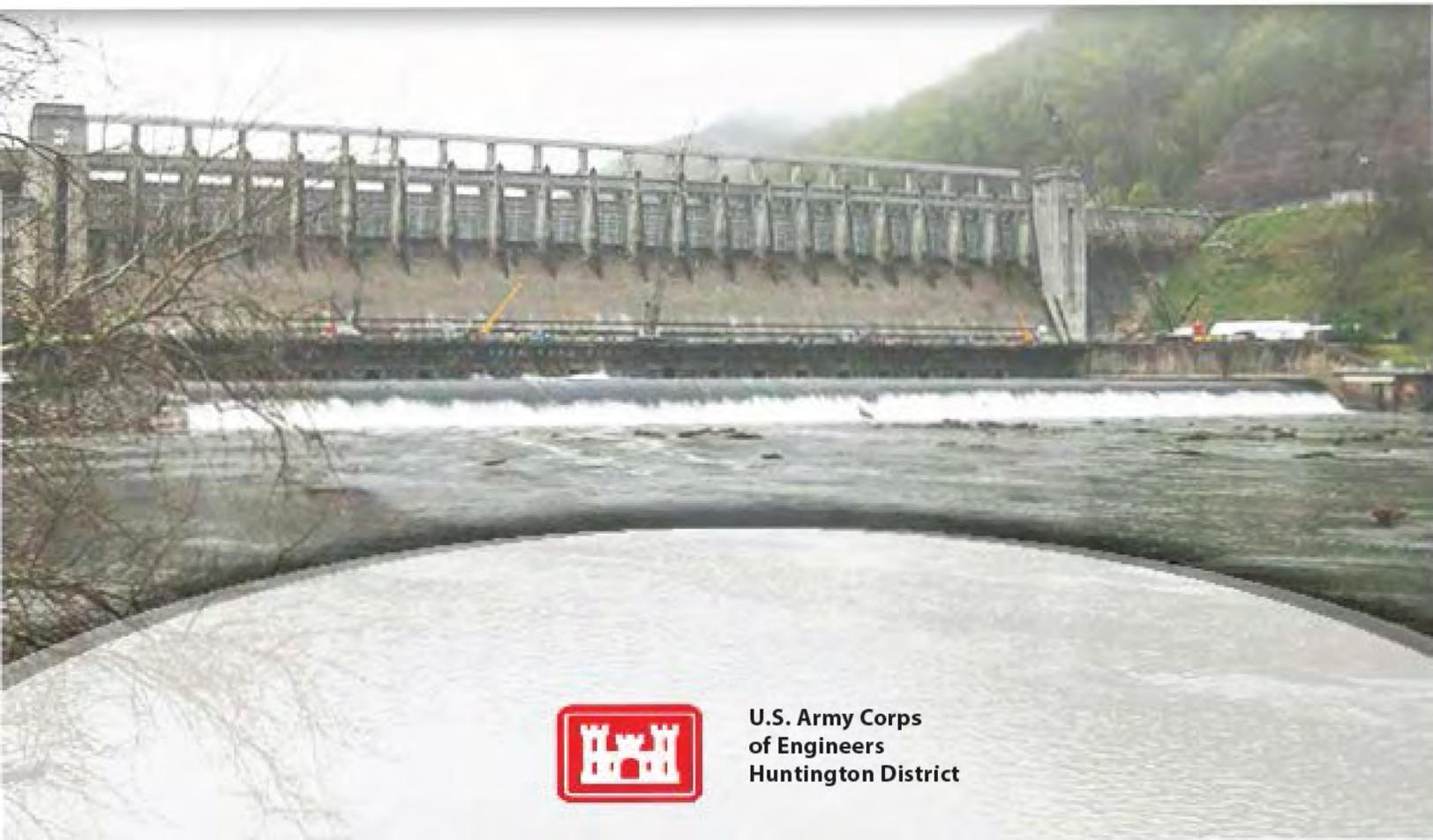
**BLN22 – Parking Lot Adjacent to Dam on Left Abutment
18 May 2016**



**BLN23 – Operations Office 701 Miller Avenue
18 May 2016**



**BLN24 – Operations Office and Warehouse 701 Miller Avenur
18 May 2016**



U.S. Army Corps
of Engineers
Huntington District

