3. Project Description (Joint Permit Application)

Pigg River Restoration at Power Dam

**Primary Purpose:** Recovery of the federally listed endangered Roanoke logperch (*Percina rex*), aquatic habitat restoration, fish passage, and restoring watershed continuity within the Pigg River ecosystem.

**Secondary Purpose:** Public safety, protection of public infrastructure downstream, public recreation, resource protection.

**Background:** Constructed in 1915 for power generation, the defunct Power Dam measures 25 feet high by 204 feet long and impounds 60 acre-feet of water over 25 acres. The U.S. Fish and Wildlife Service (Service) is working with the owner (Friends of the Rivers of Virginia [FORVA]); Franklin County; Town of Rocky Mount; Virginia Department of Game and Inland Fisheries; American Electric Power; and others to remove portions of the dam. The culmination of 12 years of planning by conservation partners, this project will remove the last impediment to fish passage within a 75-mile reach of the Pigg River from the headwaters downstream to Leesville Reservoir. The project will restore 2.2 miles of aquatic instream habitat impounded upstream of Power Dam for the federally and state listed Roanoke logperch and smallmouth bass (*Micropterus dolomieu*). Another mile upstream of the impoundment for a total of 3.2 miles above Power Dam and 5 miles downstream of the dam will be improved by increased complexity of instream habitat, vegetation, and competency to transport sediment. The remaining 45-mile river segment downstream to Leesville Reservoir will also improve with regards to channel habitat, stability, and complexity thorough restored continuity to the headwaters. Other benefits of the project include the restoration of flood attenuation, public infrastructure protection for the Rocky Mount Wastewater Treatment Plant and the Route 713 Bridge, removal of a public safety and boating hazard, and establishment of a public access area and county park for recreational fishing and boating.

**Work to be Performed:** One hundred and forty feet of the upper 8.5 feet of concrete across the dam will be removed to match adjacent floodplain elevations to restore flood capacity and protect and maintain riparian habitat upstream. Below this floodplain notch, 95 feet (48 percent) of the center of the dam will be removed to restore river flow. Ultimately the opening will match the stable channel dimension for this reach per surveys obtained 100 yards downstream.

A section of dam 50 feet long on the north side will remain undisturbed to preserve and protect the power house and relict dam section as a historical marker and preservation piece. A portion of the south section will also remain undisturbed and together approximately 70 percent of the base of the dam will remain intact. Work resulting in a release of sediments from behind the dam will be conducted after June 30th to reduce impacts to spawning fish and require up to 90 days to complete. Floodplain level notching at or above the level of sediments may occur between January 1st – March 15th. This approach will also maintain channel stability, sediment carrying capacity and competency, preserve historic cultural resources, and achieve remaining project goals.
Construction Activities (sequence): Work will be conducted in the following sequence:

1. Mobilization of equipment and materials onto jobsite.
2. Placement of erosion and sediment control (ESC) measures at limits of disturbance.
3. Establish access road improvement/temporary causeway. This includes placement of mats, stone, and gravel along access road into site and area under bridge leading up to dam and along base of dam (see Figure 3 for location).
4. Complete Phase I of dam removal January 1 to March 15. First notch is planned to drain pool behind dam and expose woody debris (Figure 2). Notching will be completed by hydraulic hammer attached to excavator operating from base of dam. Up to 1,200 ft² of dam face will be removed. Clean concrete debris will be used to fill 2,800 ft² of subaqueous bottom just below the dam on the side opposite the power house between the bank and the first buttress. Any additional fractured concrete will be loaded into trucks and hauled offsite to disposal area or stockpiled on-site in designated areas. All other concrete and metal debris that enters the waterway will be removed and disposed of in an approved upland disposal facility.
5. Removal and disposal of woody debris above dam. Mobilize equipment to lift and pull woody debris from above dam downstream to base of dam. Load material into trucks and transport to stockpile area for drying and chipping. Access and configuration of woody debris (log jam) may require step 6 to be completed prior to woody debris removal.
6. Complete Phase II of dam removal after June 30 and outside of time-of-year restrictions for logperch. Procedure will follow step 4, removing 1,320 ft² of center portion of dam. Phases I and II will occur simultaneously if Phase I cannot be completed prior to March 15 (Figure 2).
7. Remove temporary construction access/causeway, perform final grading of wetland bench, restore/stabilize area, and re-establish public access.
8. Apply permanent erosion control measures (native seed, planting shrubs, and matting).

Schedule: Demolition may begin as early as January 2016, contingent on permits, and be completed by September 30, 2016. No work will be performed below ordinary high water March 15 to June 30 of any year.

Erosion and Sediment Control Measures (ESC): An ESC plan has been prepared and approved by Franklin County. ESC measures will be installed prior to any ground disturbing activities and will be maintained for the life of the project. Temporary ESC measures to be utilized include silt fence, and temporary and/or permanent stabilization. During the life of the project, temporary stabilization (seeding, mulching, etc.) will be applied, as needed, to those areas of disturbed soil. Upon completion of the demolition work, the channel banks exposed as a result of the dam removal will be permitted to stabilize and revegetate naturally.

Quantities: The project will involve partial removal of the dam and hauling or stockpiling of demolition debris to a designated disposal site. There is an estimated 1,776 cubic yards (yd³) of concrete dam material of which 715 yd³ are proposed for removal. In addition, 3,000 yd³ of
woody debris and 106,855 yd$^3$ of sediment behind the dam are involved. Removal will be carried out by contract services with access provided through county and FORVA properties. The Service has a signed restoration agreement with FORVA, Town of Rocky Mount, and adjacent landowners and provided design, permitting, project management, and other technical services with the planning and implementation of the project.

**Spill Prevention and Response:** Fuel storage will not be allowed within 100 linear ft of any water body. When possible, maintenance and refueling activities will take place at least 100 linear ft from any water body and only in areas designated for refueling activities on the project plans or as directed by the site manager. If this is not practical (i.e. large cranes or large excavators), changing fluids and refueling equipment may occur within 100 linear ft of a water body. However, these activities will occur within an established secondary containment and/or the receptacles on the equipment will be completely surrounded by oil absorbing pads that can absorb any spill that may occur. Any spills of motor oil, vegetable oil, hydraulic, coolant, or similar fluids, not contained before entry into the action area, will be reported to this office (804 693-6694) and the National Response Center (800 424-8802), immediately. An emergency spill response kit shall be kept onsite at all times that work is being performed or when work personnel are present.

**Aquatic Conservation Measures:**

- This project will adhere to instream time of year restrictions for logperch from March 15 through June 30 to avoid the spawning period.

- Fish relocation will occur within the location of the proposed wetland bench by a qualified individual prior to the placement of fill after establishment of the causeway.

- Prior to beginning work, all construction vehicles that will be operated instream will use low toxicity type hydraulic fluid approved by the site manager. All vehicles will be inspected daily for leaks and repaired prior to working in or near water. Vehicles will be cleaned daily to remove any residual grease, motor oil, hydraulic fluid, coolant, or other potentially toxic substances prior to entering water.

- Pre-construction clearing and grading will be minimized where possible. Replanting on 8-ft centers will occur in areas where soil disturbance and removal of live roots and stumps of native woody vegetation occurs.

- Tree removal within the work area is prohibited and must be approved by the site manager prior to performing activity. Concrete shall be stockpiled in non-forested portions of the temporary stockpile area designated for concrete and other approved non-forested areas prior to engaging in any clearing of vegetation. No vegetation shall be cleared or disturbed within 35 ft landward of water without prior approval by the site manager.

**Impacts to Waters of the U.S.** Complete descriptions of wetlands in the project area and table of Waters of the United States are attached in Appendix A. Permanent impacts will result from
excavation and removal of woody debris (assuming the removal of woody debris is considered a regulated activity), creating a scrub/shrub wetland bench at the base of dam, and draining of the impoundment behind the dam (Table 1). These impacts are required to achieve project restoration goals and offset project impacts resulting from draining the impoundment created by Power Dam.

The wetland bench is necessary for project completion and to offset project impacts. The area where the wetland bench will be established (2,800 ft²) is currently part of a scour hole below the dam and is expected to be cut off from the mainstem of the river once sediment is released and fills the channel up to 2 feet above existing elevations (Kris Bass Engineering 2015). The wetland bench will consist of clean concrete debris from the dam covered with up to 6 inches of topsoil with a final grade matching the adjoining scrub/shrub wetland. The bench will be utilized for interim placement of woody debris and equipment staging during the woody removal process prior to completion. The wetland is expected to assist with formation of a stable channel configuration below the dam, function dually as a floodplain, and provide additional wetland functions and values. The wetland will be protected from scour by the dam remnant upstream and the restored channel configuration.

Temporary fill will result from an equipment access ramp consisting of class II rock, gravel, and wood mats extending to, and along, the base of the dam over riparian wetlands and non-vegetated subaqueous bottom. The road will result in 3,375 ft² of temporary impacts above OHW. The causeway at the base of the dam will result in 2,075 ft² of temporary impacts below OHW (to stream bottom).

Woody and concrete debris will be transported to 2 temporary stockpile areas. The wood stockpile area is located in an agricultural field and is approximately 10,805 ft². The concrete stockpile area is located adjacent to the Pigg River in a previously disturbed area and is approximately 13,025 ft². An estimated 106,855 yd³ of sand will be liberated by removal of dam and are a part of the Pigg River restoration effort. A portion of this sediment will eventually move downstream to Leesville Reservoir. These existing sediments are not regulated by the Corps.

Permanent impacts will occur in non-vegetated open water by draining the impoundment behind the Power Dam. These impacts are necessary for achieving the restoration goals of the project and will result in desirable and beneficial outcomes for aquatic life, public safety, protection of public infrastructure, and recreational use.

There are no project activities listed in Virginia Code, Section 62.1-44.15:20 that will result in significant alteration or degradation of existing wetland acreage or functions, specifically by draining. Surveys in 2013 and 2015 of wetlands within the project area documented the impounded river above Power Dam is at least 1.5 feet lower than the top of bank at base flow and a levee exists between the edge of water and wetlands. These wetlands are hydrologically supported through inflow from upland tributaries fed by groundwater seepage and surface runoff. Separated from the Pigg River with the exception of the perched discharge point near Power Dam, these wetlands are not dependent upon the Pigg River hydrologically and only receive
floodwater when the levees are overtopped. Furthermore, no evidence of backwater effects were documented in instances where a channel connecting wetlands to the river was observed. Wetlands are perched above the river and will not be drained by lowering water levels behind the dam. Completion of the project will also significantly reduce the deleterious effects that scouring and deposition are having in these wetlands due to the presence of the dam and woody debris blockages.

There are no project activities listed in Virginia Code, Section 62.1-44.15:20 that will alter the physical, chemical, or biological properties of state waters and make them detrimental to the public health, animal or aquatic life, or to the uses of such waters for domestic or industrial consumption, or for recreation, or for other uses. Studies completed for this project have demonstrated that no toxic levels of contaminated materials or compounds will be released and redistribution of sediments trapped behind Power Dam will be beneficial to the physical and biological properties of state waters upstream and downstream of Power Dam (Froehling & Robertson, Inc. 2007, Kris Bass Engineering. 2015). Baseline studies conducted to evaluate the physical habitat, water chemistry, and biotic communities in the vicinity of the dam will be utilized for post project monitoring (G. Devlin. Virginia Department of Environmental Quality, email to W. Smith, Service, November 10, 2015., Hitt et al. 2009).

Table 1. Jurisdictional impacts upstream and downstream of Power Dam.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Excavation (ft²)</th>
<th>Permanent Fill (ft³)</th>
<th>Temporary Fill (ft³)</th>
<th>Draining (lf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upstream</td>
<td>Downstream</td>
<td>Upstream</td>
<td>Downstream</td>
</tr>
<tr>
<td><strong>Above OHW</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete/Wood Stockpile²</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Temporary Access Road</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Sub-total Above OHW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Below OHW</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dam Notching</td>
<td>1</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Temporary Causeway</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Wetland Bench</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>2,800</td>
</tr>
<tr>
<td>Woody Debris Removal</td>
<td>20,890</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-total Below OHW</td>
<td>20,890</td>
<td>-----</td>
<td>-----</td>
<td>2,800</td>
</tr>
<tr>
<td>Total Impacts Above and Below OHW</td>
<td>20,890</td>
<td>0</td>
<td>0</td>
<td>2,800</td>
</tr>
</tbody>
</table>

²106,855 yds³ of sediment (sand) will be released. A portion of this sediment will eventually move downstream to Leesville Lake. These existing sediments (1,716,000 ft³) are not regulated as fill by the Corps.

²Upland Impacts

**Sediment Fate and Transport Modeling:** Kris Bass Engineering, Inc. (KBE) assessed the transport capability of the downstream channel to mobilize and move sediment from 3 miles above Power Dam to Leesville Reservoir, a distance of approximately 53 river miles. KBE concluded that 90 percent of the downstream channel between the dam and Leesville Lake had been altered or destabilized by dredging for flood control and by land use changes. The channel was incised, embedded with excessive sand, transitioning geomorphically, and characterized by channel widening, bank failure, and sloughing. KBE concluded the channel was too wide and the channel slope insufficient proportional to the watershed contribution to move sediment during
less than a 10 year flood event. Release of sediment behind Power Dam would prompt the channel to undergo permanent morphological changes resulting in more diverse and complex habitat features after dam removal. KBE also concluded:

1. Intermediate notching does not affect sediment transport capacity and competency. A single dam removal event would have the same effect as several smaller removal events.

2. The dam increases sediment deposition up to 3 or more miles upstream.

3. Approximately 112,519 tons (106,855 yd³) of sediment will be released over a period of 4 to 5 months after dam removal and will require up to a year to redistribute downstream.

4. During a 10 year or greater flood event a fraction of the sediment released from the Power Dam site can be transported to Leesville Lake within 24 hours.

5. The majority of sediment will be permanently deposited 1 to 3 miles downstream and in Leesville Lake. The channel will fill with sediment up to 2 feet within the first 1/2 mile below the dam and several inches may be expected in reaches below that. Additional flow from Big Chestnut and Snow Creek tributaries will increase water volume which facilitates sediment transport in the lower reach of the Pigg River.

6. Sediment concentrations during runoff events could increase 4 to 10 times over background and persist for 3 to 5 years after dam removal.

7. The optimal time for dam removal is after June 30 to minimize impacts to the spawning season for Roanoke logperch.

8. Release of sediment will cause permanent morphological changes to the channel resulting in more diverse and complex habitat features over time.

9. Monitoring should be conducted after dam removal to help inform future management decisions and restoration actions.

Impact Offsets and Mitigation: A total of 2.25 miles of instream habitat and 8.8 acres of forested riparian habitat upstream of Power Dam; and 0.06 acres scrub/shrub wetlands and 5 miles of enhanced instream habitat downstream of Power Dam will be created as offsets to permanent and temporary impacts resulting from activities associated with this restoration project. In addition, 75 continuous miles of unimpeded river channel will be opened to fish passage and recreational boating. Specific offset details include:

- 75 continuous miles of free flowing river will be opened to fish passage and recreational boating.

- 1,140 ft² of natural subaqueous bottom as habitat for logperch and other aquatic organisms will replace the dam footprint. An additional 2,800 ft² (0.06 acres) of existing subaqueous bottom in the scour hole at the base of the dam will be converted to scrub/shrub wetlands.
• 8.2 acres of forested riparian wetlands permanently flooded by the impoundment will be restored upstream of the dam.

• 2.25 miles of instream riffle/pool aquatic habitat 65 feet in width will be restored upstream of the dam and be made accessible to Roanoke logperch and other aquatic organisms.

• 5 miles downstream of the dam and 1 mile upstream of the impoundment are expected to develop more diverse and complex habitat features consisting of instream bars, vegetated benches, riffles, pools, backwaters, woody debris, and a deeper, narrower primary channel as a result of restored sediment transport and mobilization.

**Monitoring:** Photographic documentation of project activities will occur during construction. Qualitative and quantitative monitoring will be conducted annually for a period not to exceed 5 years post-construction. The purpose of monitoring will be to evaluate project stabilization and inform future natural resources management decisions. Stabilization metrics include the formation of stable channel morphology up to 3.2 miles upstream and 5 miles downstream of the dam that consists of riffles, pools, bars, benches, banks vegetated above OHW, deposition, instream habitat, mobilization of sediment, and fish passage. A monitoring plan with methodology will be submitted to interested regulatory agencies as part of the Corps permit issuance and include permanent surveyed channel cross sections, pebble counts, photography stations, sediment monitoring, and instream habitat quality assessments.

**Avoidance and Minimization of Impacts to Surface Waters:** Project alternatives included 2 primary and 2 associated secondary actions that involved full dam removal, partial dam removal, natural remobilization of sediment, and sediment dredging. Partial dam removal with natural remobilization of sediments were determined to be the least environmentally damaging practicable alternatives in terms of impacts to water quality and fish and wildlife resources (Table 2).

**Table 2.** Design alternatives and evaluation criteria utilized in determining the least environmentally damaging practical alternative, Pigg River Restoration at Power Dam, Franklin County, VA. Cells containing an X indicate compliance with evaluation criteria.

<table>
<thead>
<tr>
<th>#</th>
<th>Primary &amp; Associated Secondary Alternatives</th>
<th>Avoids/minimizes wetland impacts</th>
<th>Avoids/minimizes land/forest disturbance</th>
<th>Minimizes effects to listed species</th>
<th>Meets project purpose &amp; need</th>
<th>Available alternative to applicant</th>
<th>Avoids water withdrawal</th>
<th>Minimizes public and cultural impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Complete Dam Removal</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>Partial Dam Removal</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>Natural Remobilization Of Sediment</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>Dredging of Sediment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>No Action</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Alternative 1:** Complete dam removal involves demolishing all traces of Power Dam from bank to bank, down to natural submerged bottom. This alternative was rejected because full removal
could potentially expose forested floodplains and wetlands upstream maintained structurally by Power Dam to erosion, slumping, and mass wasting. Destabilization of these areas would create significant volumetric releases of material affecting public infrastructure and Roanoke logperch. This would also eliminate plans for leaving a portion of the dam and power house in place for historical interpretation and public remembrance.

**Alternative 2:** Partial dam removal involves notching the dam to a configuration matching the dimensions of a stable channel and floodplain cross section obtained approximately 100 yds downstream of Power Dam. This approach retains a known stable channel configuration and leaves in place sections of the dam on both sides of the river that support the persistence of forested riparian areas upstream that otherwise might be exposed to erosion and collapse. The channel downstream is classified as a Rosgen E4 and is described as sinuous riffle/pool dominated by gravel beds and “are hydraulically efficient channel forms” that “maintain a high sediment transport capacity” (Rosgen 1998). Altering the dam to match downstream channel morphology provides assurance the resulting channel upstream of the dam will be stable and remain competent to move sediment. It also protects and maintains riparian habitat established post dam construction. This alternative was considered the safest approach for achieving the project purpose and goals without knowledge of the original channel configuration prior to the construction of Power Dam.

**Alternative 3:** Natural remobilization of sediment avoids any mechanical disturbance of sediment from behind the dam. Material would be remobilized by natural river discharge over the period of up to 1 year as modelled and described by KBE. This alternative mobilizes and redistributes sediment along the 50 miles of the Pigg River down to Leesville Reservoir and results in beneficial aquatic habitat outcomes and improved channel complexity.

**Alternative 4:** Dredging of sediment from behind the dam requires 1) access to sediment, 2) mechanical removal, 3) stockpiling and dewatering, and 4) off-site disposal. Access to sediments behind the dam would involve more than 2 miles of channel through a narrow forested valley with steep side slopes. Access would be possible by a) new roads through private property cut into the valley side slopes or through wetlands near the river channel, b) barges with staging areas for launching, loading, and off-loading material, or c) instream travel upon an access road inside the active channel with temporary flow diversion.

Mechanical removal would be conducted by either excavation using barges and haul trucks or hydraulic dredge. An excavator located either on land or a floating barge would transfer sediment to another barge and/or dump truck at staging areas which would transport the material to a disposal site. Hydraulic dredging, also conducted by barge, would require large quantities of water withdrawals from the river to move the material to a stockpile area within a few thousand feet of the dredge site for dewatering. The volume of carrier water needed is typically 5 to 10 times the *in situ* volume of sediment, which equates to 1,000 to 2,000 gallons per *in situ* cubic yard (ITRC 2014). Stockpiling and dewatering associated with hydraulic dredging would require multiple sites of low topographic relief adjacent to the river where material would be temporarily stored within a confined area and permitted to dry before being transported to a disposal site. Offsite disposal involves permanent storage in an approved disposal site or facility.
Alternative 4 was rejected as impractical, environmentally destructive, producing undesirable harm to natural resources, and counterproductive to the project goals. Access roads and staging areas would involve use of private property and create undesirable and irreparable damage to riparian forests and valley side slopes due to valley topography and clearing of trees. Furthermore, the valley does not contain suitable upland sites for temporary storage and dewatering of sediment. The only suitable dewatering sites with appropriate topography are forested wetlands which would be negatively impacted by fill. Hydraulic dredging is not possible due to insufficient water volumes for withdrawal and mechanical dredging would create sustained turbidity during low flows harming aquatic resources. Sediment behind Power Dam has tested negative for harmful levels of contaminants and is necessary for the recovery and restoration of the downstream channel goals of the project (Kris Bass Engineering. 2015). Overall, alternative 4 is not a practical alternative available to the applicant in achieving the project purpose and goals.

**Alternative 5:** No Action.

**Least Environmentally Damaging Practicable Alternatives.** We determined that Alternatives 2 and 3, partial dam removal and natural remobilization of sediment, were the least environmentally damaging practical alternatives. The sediment fate and channel competency study by KBE confirmed alternatives 2 and 3 were appropriate for achieving the project purpose and goals. The resulting model provides a level of assurance the design approach is sound prior to work commencing. Furthermore, releasing sediment downstream was the preferred alternative to dredging which could produce sustained turbidity during low flow conditions.

**Effect on Adjacent Landowners:** There will be no significant tangible negative effects to landowners upstream and downstream of the project and effects would be dependent upon the perceptions of the affected parties. Effects to upstream landowners include lowering of the water surface in the river, deepening of the channel, and less frequent overtopping of banks during floods. No structures, docks, ladders, steps, trails, or swings between the river bank and water were observed during a site reconnaissance on November 17, 2015 suggesting recreational uses and frequency that would be dependent on maintaining the present water level were minimal. Additional effects to landowners upstream of Power Dam include the return of river aesthetics and sounds; natural bed components and complexity featuring riffles, pools, bedrock, gravel, leaf packs; associated improvement in fish habitat and fishing opportunities; increased flood attenuation; mobilization of channel sediment and woody debris; and safer instream conditions.

Effects to downstream landowners will likely go unnoticed and involve desirable changes in bed features previously discussed. The first mile downstream of Power Dam where the most noticeable changes will occur due to sediment involve 3 private landowners along the river left side and localities along river right. Slopes are steep and forested adjacent to the river and any regular access to the river is not obvious. Activities by these landowners appear primarily passive or agricultural.

The Town of Rocky Mount, Franklin County, Virginia Department of Transportation, and the Service support the removal of Power Dam and have provided funding, professional services, or technical assistance to FORVA’s project planning efforts. A 10 year Federal Agreement for the Pigg River restoration project was signed on September 19, 2015 by landowners upstream and
downstream of the work area and included FORVA, Town of Rocky Mount, Larry & Glenna Moore (Nadine Hawkins), and the Service. The Service also was supported by The Town of Rocky Mount and received minimal resistance from the public during removal of Veterans Park dam in December 2013. Furthermore, FORVA is mailing notification letters to 33 parties that own land adjoining the Pigg River 2.5 miles upstream and 1 mile downstream of the dam inviting them to a public presentation on January 13, 2016 at the Franklin County administration building. The Service is hosting a website containing facts and studies associated with the project located at:

http://www.fws.gov/northeast/virginiafield/partners/powerdam.html
Literature Cited

Froehling & Robertson, Inc. 2007. Sediment sampling and analysis study, Pigg River Power Dam, Franklin County, VA. Report to FishAmerica Foundation.


# Appendix A

PIGG RIVER RESTORATION AT POWER DAM

Table of Waters of the United States Within the Project Vicinity

November 18, 2015

<table>
<thead>
<tr>
<th>Site #</th>
<th>Latitude (W)</th>
<th>Longitude (N)</th>
<th>NWI Cowardin Class</th>
<th>Description</th>
<th>Size (acres)</th>
<th>Class of aquatic resource</th>
<th>Rosgen Classification</th>
<th>Impact Type</th>
<th>Offsets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>79°51'35.41&quot;</td>
<td>36°59'44.69&quot;</td>
<td>PSS1P</td>
<td>FW Forested/Scrub under 713 bridge</td>
<td>0.16 acre</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Temporary fill for access</td>
<td>1:1 restore in place</td>
</tr>
<tr>
<td>2</td>
<td>79°51'29.46&quot;</td>
<td>36°59'32.81&quot;</td>
<td>PFO1A</td>
<td>FW Forested/Scrub</td>
<td>8.95 acres</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Avoided</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>79°51'27.04&quot;</td>
<td>36°59'6.542&quot;</td>
<td>PFO1A</td>
<td>FW Forested/Scrub</td>
<td>2.08 acres</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Avoided</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>79°51'49.45&quot;</td>
<td>36°59'3.272&quot;</td>
<td>PFO1A</td>
<td>FW Forested/Scrub Not connected to river.</td>
<td>2.4 acres</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Avoided</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>79°51'32.88&quot;</td>
<td>36°59'34.89&quot;</td>
<td>PEM1Cx</td>
<td>Not Found</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Avoided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (2a)</td>
<td>79°51'35.02&quot;</td>
<td>36°59'36.86&quot;</td>
<td>PUBHx</td>
<td>Open Water FW Pond within Site 2</td>
<td>1.85 acres</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Avoided</td>
<td></td>
</tr>
<tr>
<td>7 (2b)</td>
<td>79°51'26.77&quot;</td>
<td>36°59'26.68&quot;</td>
<td>PUBHx</td>
<td>Open Water FW Pond within Site 2</td>
<td>0.08 acres</td>
<td>section 10 non-tidal</td>
<td>NA</td>
<td>Avoided</td>
<td></td>
</tr>
</tbody>
</table>
**SITE DESCRIPTIONS**

**Summary:** Assessed wetlands are forested/scrub consisting primarily of boxelder (*Acer negundo*), black willow (*Salix niger*), green ash (*Fraxinus pennsylvanica*), and alder (*Alnus serrulata*) with small areas of surface water observed. Seeps and/or perennial tributaries along the landward edge of wetlands upstream of the dam are the dominant source of hydrology other than river flooding. An exception was Site 4 where no tributaries, seeps, or surface water was observed. A significant upland levee is present between wetlands and the river which blocks any primary hydrological connection except during major floods. These riparian wetlands are at an elevation above the pool formed by the dam and hydrology is from groundwater seeping out at the toe of adjacent uplands and runoff. Where breaks in the levee exist water flows out and down the bank into the pool formed by the dam rather than any backwater effects from the pool. Beaver (*Castor canadensis*) are active, using the wetlands as a food source. Their dens are presumably in the river banks since no lodges or beaver dams were observed. No connection or phenomena was observed that caused the river to retain, stage, or back water into the adjacent wetland during base flow or indicate that these wetlands would be drained or negatively impacted by the project.

Site 1. Forested Scrub wetland 0.16 acres in size located under the Route 713 bridge below Power Dam. Area will be temporarily impacted by fill placed to provide equipment access to dam. Boundary was flagged with survey tape and wetland determination data forms were completed. Dominant vegetation consists of mimosa (*Albizia julibrissin*) and boxelder. Surface hydrology is predominately from river overtopping banks during floods. No direct connection by channel to river. Area is impacted by heavy debris flows, bridge, and trimming of vegetation presumably by anglers.

<table>
<thead>
<tr>
<th>Site</th>
<th>Longitude</th>
<th>Latitude</th>
<th>Type</th>
<th>Area (LF)</th>
<th>Hydrology</th>
<th>Section</th>
<th>Tidal Status</th>
<th>Conversion</th>
<th>Impoundment</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>79°51′34.32″W</td>
<td>36°59′41.52″N</td>
<td>Riverine, impounded</td>
<td>10,730</td>
<td>permanent</td>
<td>section 10</td>
<td>non-tidal</td>
<td>NA-impounded</td>
<td>Permanent Conversion</td>
<td>1:1 riverine in place</td>
</tr>
<tr>
<td>9</td>
<td>79°50′26.16″W</td>
<td>36°59′27.97″N</td>
<td>Riverine, downstream of dam</td>
<td>18,480</td>
<td>temporary</td>
<td>section 10</td>
<td>non-tidal</td>
<td>B5c – F5</td>
<td>2075 SF</td>
<td>2800 SF of Shrub/Scrub created in place</td>
</tr>
<tr>
<td>10</td>
<td>79°51′37.45″W</td>
<td>36°58′42.47″N</td>
<td>Riverine/Tributary stream</td>
<td>605</td>
<td>permanent</td>
<td>section 10</td>
<td>non-tidal</td>
<td>G4</td>
<td>Avoided</td>
<td></td>
</tr>
</tbody>
</table>
Site 2. Forested Scrub wetland 8.95 acres in size located just upstream of Power Dam. Area will not be impacted by the project. Boundary was flagged with survey tape and wetland determination data forms were completed. Dominant vegetation consists of boxelder, black willow, and green ash. Site 2 includes 1.85 acres and 0.08 acres of open water in 2 separate areas. Four perennial streams discharge into Site 2. Water flows out of Site 2 to the Pigg River at 2 places, neither of which have backwater effects from the adjacent river impoundment. This is due to the wetland invert being perched 1.4 feet above the river channel and a well-developed levee between the wetland and the river.

Site 2 is being negatively impacted by a large logjam in the adjacent river channel formed by the presence of Power Dam that raises the base flow elevation in the river 1.5 feet above the dam. The debris diverts flood flows into Site 2 which serves as a by-pass or secondary channel during floods resulting in heavy sediment deposition, scour, erosion, vegetation loss, and head cutting. The magnitude of these flows exceed Site 2’s function as flood attenuation and is resulting in continued degradation and loss of wetlands.

The degradation presents as major deposition (2-6 inches) of sediment that has recently occurred as flows overtopped the banks and flowed through riparian forests of boxelder and green ash, then black willow, and finally the open water portion of the wetland. While sediment filled the forested portion of the wetland, scour prevented any meaningful establishment of emergent vegetation in the open water portion. Furthermore, a headcut has formed as these flows exit the wetland at the dam which will ultimately result in draining of the wetland or connecting it to the river as a backwater area (there is a 1.4 ft head difference in water surface between the wetland and the pool formed by the dam).

Subsurface connections across the levee between the river and wetlands were assessed and none found. The water elevation in soil pits was 0.1 feet above the wetland water surface on the landward side and 0.1 feet lower on the river side. However, water in soil pits was 1.65 feet below the wetland at the levee indicating an aquiclude present between the river and the wetlands (see attached graphic).

Site 3. Forested Scrub wetland 2.08 acres in size. Area will not be impacted by the project. Boundary was flagged with survey tape and wetland determination data forms were completed. Dominant vegetation consists of boxelder and spicebush (*Lindera benzoin*). A small channel thorough the levee extended into the wetland 100 ft or more and provided a connection to the river. The first 70 linear feet of this channel was backflooded by the river where it passed through the levee and was contained entirely within the channel. Beyond the backwater the channel entered the wetland proper and small amounts of flow were observed. The portion of this site moving upslope through a break in the adjacent slope was included in the delineation just beyond the flood elevation of the river.
Site 4. Identified from National Wetland Inventory maps, site inspection revealed this wetland to be perched over 5 ft above the water surface of the Pigg River. Site is clearly not connected to the river and will not be impacted by the project. Boundary flagging and wetland determination data forms were not completed for this site.

Site 5. Identified from National Wetland Inventory maps, this site was not found during field assessments on November 17, 2015.

Site 6. This site is an open water ponded area within Site 2 that is 1.85 acres in size. Area will not be impacted by the project. Maintained by several tributaries and runoff, depth and flood scour is preventing establishment of wetland vegetation.

Site 7. This site is an open water ponded area within Site 2 that is 0.08 acres in size. Area will not be impacted by the project.

Site 8. The portion of the Pigg River impounded behind and upstream of Power Dam. Consists of 10,730 linear feet or 25 acres of open water. Site will be permanently converted by the project to a Rosgen B5 free flowing channel type with vegetated banks.

Site 9. The open water portion of the Pigg River downstream of Power Dam. Consists of 18,480 linear feet of Rosgen B5c-F5 channel type. Site will be temporarily affected by sediment after project is completed. 2075 SF will be temporarily impacted by access causeway and 2800 SF will be permanently impacted by conversion to scrub/shrub wetland bench. Long term positive effects involve improved sediment transport competency, aquatic habitat, vegetated bars and benches, and reduced bank erosion.

Site 10. Rosgen G5 perennial stream located upstream of Power Dam. Area will not be impacted by the project. 605 linear feet of the boundary was flagged with survey tape and wetland determination data forms were not completed. No backwater effects were observed the entire length of the stream to the Pigg River during base flow.