



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Virginia Field Office
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Gloucester, VA 23061

January 13, 2016

Memorandum

To: Coordinator, Partners for Fish and Wildlife Program, Virginia Ecological Services, Gloucester, VA

From: Field Supervisor, Virginia Ecological Services, Gloucester, VA

Subject: Pigg River Restoration at Power Dam, Franklin County, VA, Project # 2015-F-2742

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the subject project and its effects on the federally listed endangered Roanoke logperch (*Percina rex*) [logperch] in accordance with section 7 of the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA). Your August 18, 2015 request for formal consultation was received on August 18, 2015.

This biological opinion is based on information provided in the August 18, 2015 biological assessment, project proposal, telephone conversations, field investigations, and other sources of information. A complete administrative record of this consultation is on file in this office.

We determined that the proposed action is not likely to adversely affect the federally listed threatened Northern long-eared bat (*Myotis septentrionalis*) since no suitable habitat will be removed during the bat's active season. We also determined that the proposed action will not affect the federally listed threatened Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*) because no impacts to suitable habitat will occur.

CONSULTATION HISTORY

08-18-15 The Field Supervisor received the Partners for Fish and Wildlife (PFW) Program Coordinator's August 18, 2015 request to initiate formal consultation.

09-29-15 The Service participated in a site visit.

10-28-15 The Service acknowledged receipt of initiation of formal consultation request.

11-15-15 to 12-21-15 PFW staff provided additional details on the project description.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The proposed action is removal of portions of Power Dam by the PFW Program. Additionally, a permit authorization by the U.S. Army Corps of Engineers (Corps) to the Service will be necessary to remove portions of dam. The project is located at Latitude: 36°59'43.79"N, Longitude: 79°51'36.06"W just upstream of the Route 713 bridge over the Pigg River in Franklin County, VA (Figure 1). The primary purpose of the project is to support recovery of the logperch through aquatic habitat restoration, fish passage, and restoration of continuity within the Pigg River ecosystem. Secondary purposes include public safety, protection of public infrastructure downstream, public recreation, and resource protection.

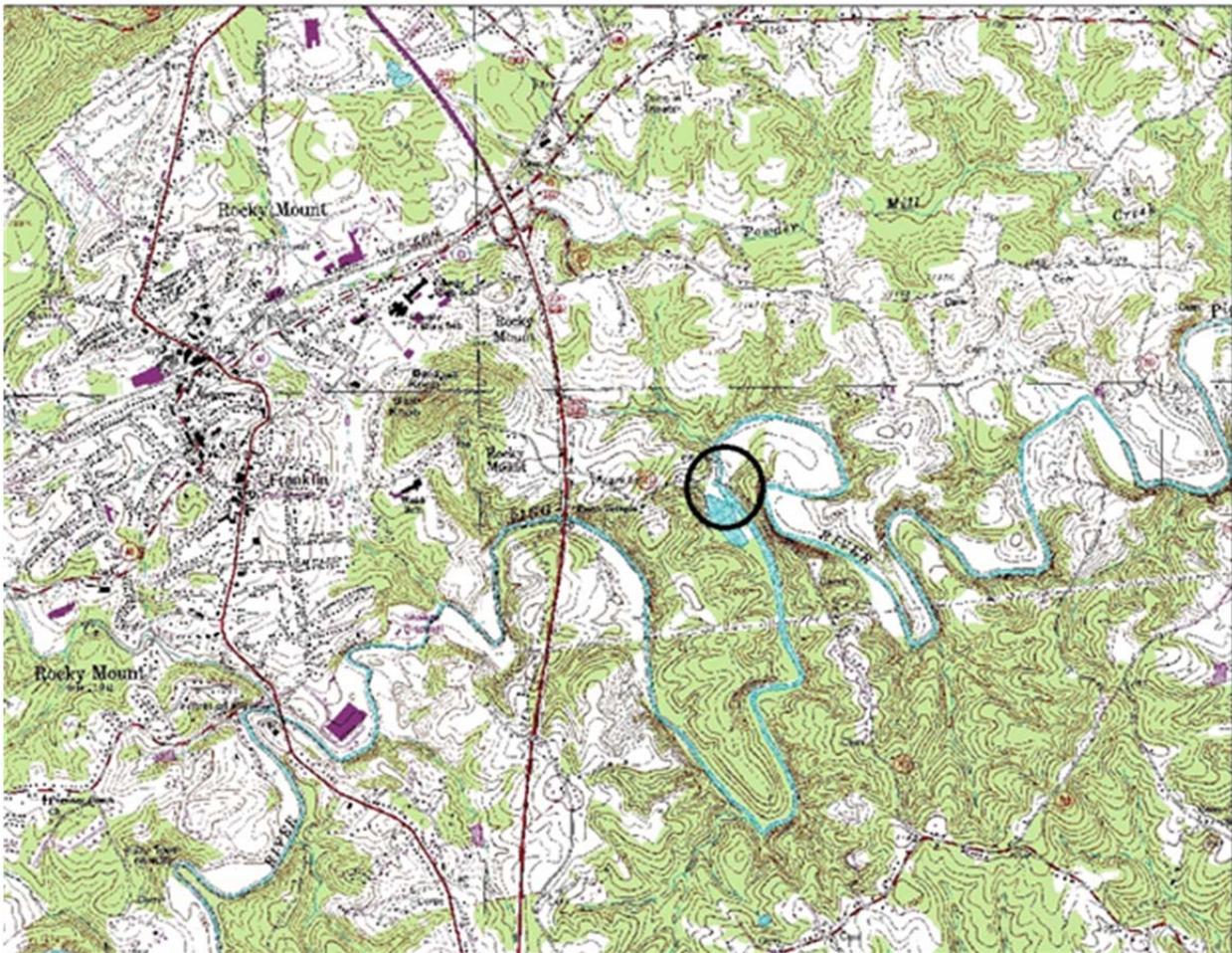


Figure 1. Project location.

Background: Constructed in 1915 for power generation, the defunct Power Dam measures 25 feet (ft) high by 204 ft long and impounds 60 acre-ft of water over 25 acres. The Service is working with the dam 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. 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 Lake. The project will restore 2.2 miles of aquatic instream habitat impounded upstream of Power Dam for the logperch. Another mile upstream of the impoundment (total = 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 project will also improve the remaining 45-mile river segment downstream to Leesville Lake for the logperch through changes in channel habitat, stability, and complexity by restoring continuity to the headwaters.

Other benefits of the project include restoration of flood attenuation, public infrastructure protection for the Rocky Mount Wastewater Treatment Plant and the Route 713 Bridge, removal of a public safety (drowning) and boating hazard, and establishment of a public access area and county park for recreational fishing and boating. The Service will consult with the public access and county park project proponent(s) once detailed development and construction plans are finalized, if warranted. Because the public access and county park will be consulted on separately in the future, if warranted, they will not be considered further in this document.

Work to be Performed: One hundred and forty feet of the upper 8.5 ft 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, the center section (95 ft or 48 percent) 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 (yd) downstream (Figure 2).

A 50 ft (top) section of dam on the north side will remain undisturbed to preserve and protect the power house and relict dam section. A portion of the south section will also remain undisturbed and together approximately 70 percent of the base of the dam is proposed to remain intact. Floodplain level notching at or above the level of sediments may occur between January 1 and March 15, 2016 if appropriate permits are in place. Work resulting in release of sediments from behind the dam will be conducted after June 30 to reduce impacts to spawning fish and will require up to 90 days to complete. This approach will maintain channel stability, sediment carrying capacity, and competency; preserve historic cultural resources; and achieve other project goals.

Equipment utilized for demolition and removal activities may include a crane, trackhoes outfitted with jackhammers, trackhoes with buckets, a track dozer, and dump trucks. Demolition debris will be loaded into dump trucks for transport to an approved upland disposal area or temporarily stockpiled in approved areas. Access to the work area will be from the temporary access road and causeway between an existing road and the base of the dam. Minor access to the channel by

an excavator working from the causeway and extending a bucket into the channel is anticipated to access errant demolition debris.

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 (OHW) March 15 through June 30 of any year.

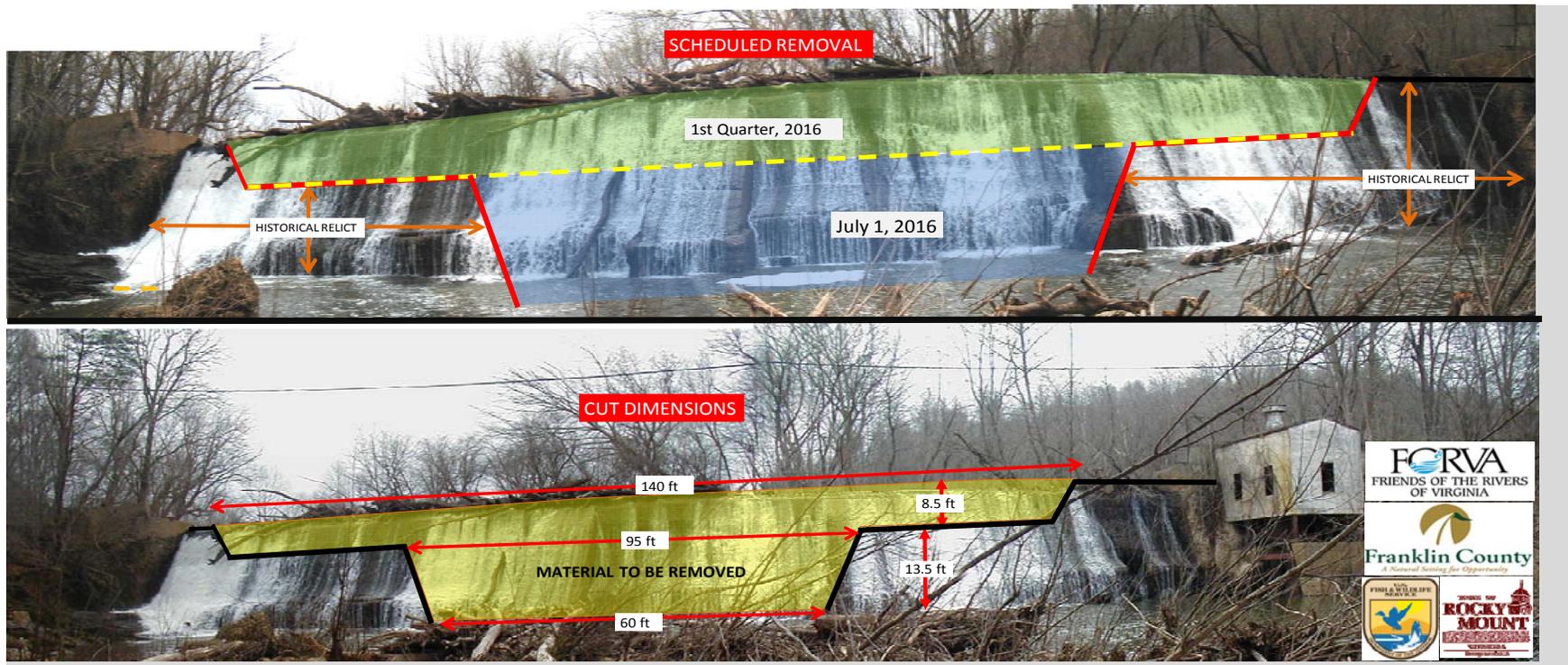


Figure 2. Power Dam modification plan (the parts of the dam that will be removed are in the colored areas: green, blue, and yellow).

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 notching 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 notching 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).

There is an estimated 1,776 yd³ of concrete dam material of which 715 yd³ are proposed for removal. In addition, there are 3,000 yd³ of woody debris and 106,855 yd³ of sediment behind the dam. 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 related to planning and implementation of the project.

ESC Measures: An ESC plan has been prepared (Figure 3). Necessary ESC measures will be used to contain sediment and minimize erosion. 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. Inspection of ESC measures will occur at least weekly, and daily during rain events in excess of 1 inch during any 24-hour period. Repair of damaged or compromised ESC structures will occur within 24 hours. Upon completion of the demolition work, the channel banks exposed as a result of the dam notching will stabilize and re-vegetate naturally.

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.

Conservation Measures:

- No instream work will occur from March 15 through June 30 to avoid the logperch spawning period.
- Fish removal 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. Fish removed, including logperch, will be relocated to the nearest suitable habitat in the Pigg River.
- Prior to beginning work, all construction vehicles that will be operated instream will use a low toxicity hydraulic fluid approved by the Service. 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 Above and Below OHW: Permanent impacts will result from excavation and removal of woody debris, 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 (Figure 3). 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 in upland 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 (Table 1 and Figure 3). An estimated 106,855 yd³ of sand will be released and is a part of the Pigg River restoration effort. A portion of this sediment will eventually move downstream to Leesville Lake.

Surveys by PFW staff in 2013 and 2015 of wetlands within the project area documented the impounded river above Power Dam is at least 1.5 ft 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 was 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 significantly reduce the deleterious effects that scouring and deposition are having in these wetlands due to the presence of Power Dam and woody debris blockages.

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).

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

Power Dam								
Activity	Excavation (ft ²)		Permanent Fill (ft ²)		Temporary Fill (ft ²)		Draining (lf)	
	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Above OHW								
Concrete/Wood Stockpile ²	-----	-----	-----	-----	-----	23,830	-----	-----
Temporary Access Road	-----	-----	-----	-----	-----	3,375	-----	-----
Sub-total Above OHW						27,205		
Below OHW								
Dam Notching	¹	-----	-----	-----	-----	¹	10,730	-----
Temporary Causeway	-----	-----	-----	-----	-----	2,075	-----	-----
Wetland Bench		-----	-----	2,800	-----	-----	-----	-----
Woody Debris Removal	20,890							
Sub-total Below OHW	20,890	-----	-----	2,800	-----	2,075	-----	-----
Total Impacts Above and Below OHW	20,890	0	0	2,800	0	29,280	10,730	0

¹106,855 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 ft²) are not regulated as fill by the Corps.

²Upland impacts.

Sediment Fate and Transport Modeling: Kris Bass Engineering (2015) assessed the transport capability of the downstream channel to mobilize and move sediment from 3 miles above Power Dam downstream to Leesville Lake, a distance of approximately 53 river miles. He surmised 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 is incised, embedded with excessive sand, transitioning geomorphically, and characterized by channel

widening, bank failure, and sloughing. He 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. He concluded:

- 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.
- The dam currently causes sediment deposition up to 4 miles upstream.
- Approximately 106,855 yd³ of sediment will be released over a period of 4 to 5 months after dam removal and will require up to 1 year to redistribute downstream.
- 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.
- The majority of sediment will be permanently deposited 1 to 3 miles downstream along channel margins as point bars or terraces and in Leesville Lake. The channel will fill with sediment up to 2 ft within the first ½ 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 and facilitate sediment transport in the lower reach of the Pigg River.
- Sediment concentrations during runoff events could increase 4 to 10 times and persist for 3 to 5 years after dam removal.
- The optimal time for dam removal is after June 30 to minimize impacts to the spawning season for logperch.
- Release of sediment will cause permanent morphological changes to the channel resulting in more diverse and complex habitat features over time.
- Monitoring should be conducted after dam removal to help inform future management decisions and restoration actions.

Impact Offsets and Mitigation:

- 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 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.

- 2.2 miles of instream riffle/pool aquatic habitat 65 ft in width will be restored upstream of the dam and be made accessible to 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 the Service and 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.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The Service has determined that the action area for this project is the 75-mile reach of the Pigg River (below OHW) starting from 25 miles upstream of Power Dam and continuing downstream for 50 miles to Leesville Lake. The action area also includes the upland areas that will be used as stockpile and access areas (27,205 ft²).

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGEWIDE

The species description, life history, population dynamics, status, and distribution and critical habitat description, if applicable, are at: Hambrick 1973; James 1979; Burkhead 1983; Simonson and Neves 1986; Burkhead and Jenkins 1991; Service 1992; Jenkins and Burkhead 1994; Ensign et al. 1997; Angermeier 1999; Stancil 2000; Rosenberger 2002, 2007; Rosenberger and Angermeier 2002, 2003; Wheeler et al. 2002; George and Mayden 2003; Mattingly et al. 2003; Roberts 2003, 2012a, b, 2013, 2014; Roberts and Angermeier 2003, 2006, 2010a, b, 2012; Lahey and Angermeier 2006, 2007; Dutton et al. 2008; Roberts and Rosenberger 2008; Roberts et al. 2008, 2009, 2010, 2013, 2014; Hitt et al. 2009; Ruble et al. 2009; Bangaru 2010; Neary et al. 2010; Anderson et al. 2013, 2014; Argentina and Roberts 2014; and Villamagna et al. 2015. No critical habitat has been designated for this species.

ENVIRONMENTAL BASELINE

Status of the Species/Critical Habitat Within the Action Area – A baseline study was conducted to evaluate the physical habitat, water chemistry, and biotic communities in the vicinity of the dam (Hitt et al. 2009). Fish and benthic macroinvertebrate sampling was conducted at 3 sites; 1 above the dam and 2 below. Site A was located at the first riffle above the impounded area (approximately 2.2 mile upstream of the dam). Sites B was located just downstream of the dam (approximately 400 ft) and Site C (approximately 1,600 ft). Fifteen of 17 fish species documented in 1978 (James 1979) were found in the baseline study. Hitt et al. (2009) noted increased richness of fish and benthic macroinvertebrates downstream of the dam.

Thirty-four logperch were documented during the study at the 3 sampling sites (Site A, B, and C) and the total population size within the study area was estimated to be approximately 167 individuals (Hitt et al. 2009). Roberts et al. (2009) conducted genetic studies and determined that there are 7 isolated logperch populations. The Pigg River and its tributary Big Chestnut Creek are 1 of the 7 populations; therefore, logperch in the action area are managed as 1 population. Roberts (2014) estimated the entire population in the Pigg River (62 miles) was 9,281 logperch or 150 logperch per mile. As a coarse estimate, we determined that the number of logperch between Power Dam and 5 miles downstream to be approximately 750 logperch (150 per mile) based on a population viability analysis study (Roberts 2014).

Factors Affecting Species Environment Within the Action Area – The Pigg River watershed is comprised of mostly agricultural and forested areas with urban development concentrated within the Rocky Mount area (Kris Bass Engineering 2015). Over 90 percent of the river downstream of the dam has been affected by watershed development, human alteration, and sediment imbalances associated with the dam (Kris Bass Engineering 2015). Kris Bass Engineering (2015) found that the Pigg River is incised, overly wide, and deeper than other natural streams with similar drainage areas. This enlargement is due to human activities within the watershed and effects of the dam. The complexity of instream habitat was found to be low (Kris Bass Engineering 2015). Substrate upstream of the dam was dominated by sand but downstream reaches had a variety of substrates (Hitt et al. 2009). Dams can affect flow, sediment movement, water temperature, and create barriers to upstream and downstream movement of aquatic organisms (Poff and Hart 2002). Hitt et al. (2009) noted differences in turbidity and conductivity between upstream and downstream sampling sites and are most likely due to Leesville Lake.

A portion of the Pigg River within the action area is listed as impaired for *Escherichia coli* in the Virginia Department of Environmental Quality's (VDEQ) Final 2012 305(b)/303(d) Water Quality Assessment Integrated Report. The sources of the impairment are listed as livestock (grazing or feeding operations), on-site treatment systems (septic systems and similar decentralized systems), unspecified domestic waste, and wildlife (other than waterfowl). The Pigg River Implementation Project for bacteria was initiated in 2006 (VDEQ 2014). Numerous best management practices have been implemented in this watershed such as stream fencing and repair and replacement of septic systems (VDEQ 2014).

A chemical spill in 1975 in the Pigg River in Rocky Mount, VA caused a catastrophic fish kill that extended 22 miles downstream (James 1979). The copper sulfate and silver nitrate spill killed approximately 28,704 fish in the Pigg River downstream of Rocky Mount. James (1979) found logperch in low numbers in 1978 in the area affected by the spill.

EFFECTS OF THE ACTION

Direct and Indirect Effects – Direct effects are the direct or immediate effects of the project on the species, its habitat, or designated critical habitat. Indirect effects are defined as those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02).

Effects Upstream of Dam

Dam Notching: Instream effects are expected to extend approximately 3.2 miles upstream of the dam due to pool draw-down and changes in stream hydrology and morphology. Pool, riffle, and run features will begin to form in the former impoundment following notching. Kris Bass Engineering (2015) concluded that both temporary and permanent geomorphic changes will occur to the river and the upstream channel is expected to equilibrate within several months. Logperch will be affected after notching of the dam when the stream channel reconfigures to the new conditions. Release of sediment will cause permanent morphological changes to the channel resulting in more diverse and complex habitat features over time.

Over the course of several years, scouring, sediment transport, and deposition will occur during high-flow events. As these changes occur, some areas will be scoured and some will be subjected to sediment deposition. The stream channel above the dam which is currently impounded will be restored to its historic configuration and provide new habitat for the logperch. We expect the logperch to expand into this area. In addition, stream connectivity will be restored and logperch that were prevented from traversing the Pigg River due to Power Dam will have access to additional habitat (75 miles of unobstructed habitat).

Excavation/Removal of Wooden Debris: The excavation and removal of woody debris will impact 20,890 ft² of substrate within the impounded area. This area is not within suitable habitat for the logperch and the primary concern with this activity is the release of sediments and increased turbidity that will occur downstream. Sedimentation effects are discussed below in the Dam Notching/Sedimentation/Channel Alteration section.

Effects Downstream of Dam

Upland Construction Activities: An upland area approximately 23,830 ft² will be disturbed to provide wood and concrete stockpile areas. The wood stockpile area is currently an agricultural field and the concrete stockpile area is 25 percent old roadbed, 30 percent wooded (trees removal is prohibited), and the remainder is a scrub/shrub disturbed area. Any sediment entering the

stream from the upland activities is expected to be minimal, although if any sediment reaches the Pigg River it may temporarily reduce habitat suitability for logperch causing them to cease feeding and other behaviors and move to clearer water until sediment levels return to background levels. The ESC plan, as proposed, is expected to avoid contribution of sediment to the Pigg River from the stockpile areas. Therefore upland construction activities are not likely to adversely affect the logperch.

Placement/Removal of Access Area and Wetland Bench Establishment: Any logperch that occur in the footprint of the temporary causeway could be injured or killed during placement and removal of rock, gravel, or wooden mats for access. The placement of the causeway will isolate an area of the river containing suitable habitat for logperch. This isolated area will be temporarily filled and used to store this woody and concrete material until it is loaded into the haul trucks. This area is approximately 2,800 ft² and will result in impacts to the streambed due to isolation from the river and placement of fill. This area is suitable logperch habitat and logperch could be injured or killed during placement of fill and movement of debris in the location of the temporary causeway. Any logperch trapped within the isolated area to be filled could be stressed, injured or killed due to instream activities or separation from food and shelter resources. To minimize effects to logperch, fish relocation will occur to suitable habitat in the Pigg River by a qualified individual prior to the placement of fill after establishment of the causeway. Fish relocation will cause temporary stress to those individuals being handled during relocation. A wetland bench will be created within the isolated area following dam notching and will permanently convert open water to scrub/shrub wetlands. This area will be cutoff from the main channel following the dam notching so impacts to logperch after the initial construction are considered in the dam notching activities.

Dam Notching/Sedimentation/Channel Alteration: The largest sedimentation events are expected during removal of woody debris, dam notching events, and subsequent storm events. The excavation of woody debris will disturb sediment trapped within the debris pile. The stream bottom will also be disturbed and result in additional release of sediments during woody debris removal. This event will result in short-term sedimentation effects. Woody debris removal is expected to disturb the streambed and cause sedimentation that may temporarily impair the ability of logperch to feed and engage in other routine behaviors.

Dam notching will drain the pool above the dam and expose extensive areas of fine and coarse sediments, thereby increasing the potential for erosion-, turbidity-, and sediment-related effects on the logperch and its habitat. Increased sedimentation will occur as the disturbed streambed and bank equilibrate to flows, sediment loosened by construction activity is washed downstream, and stored sediments upstream of the dam are released during and after notching. We expect an initial pulse of sediment will primarily affect the area immediately downstream of the dam. Sediment surveys indicate that 106,855 yd³ of sediment (sand) will be released by dam notching and will require several years to redistribute downstream. Kris Bass Engineering (2015) indicated that the pools and riffles just downstream of the dam will be affected by sand deposits. The channel will fill with sediment up to 2 ft below the dam and several inches of sediment may

be expected in reaches below that. The majority of sediment (50 to 60 percent) will be permanently deposited 1 to 3 miles downstream and redistributed over time. Sediment concentrations during runoff events could increase 4 to 10 times over background and persist for 3 to 5 years after dam notching (Kris Bass Engineering 2015). Studies at other dam removal sites indicate that in most cases, rates of sedimentation have abated to pre-construction levels within 1 to 3 years after dam removal (Heise et al. 2013, Sherman 2013). Releasing sediment can benefit the downstream channel by introducing woody debris and nutrients to enhance the channel morphology and aquatic habitats (Bountry and Greimann 2009).

The effects to logperch will depend, in part, on the type, amount, and extent of sediments released into the water column, the magnitude and duration of discharge, and background turbidity concentrations. In response to any sediment plume that occurs, logperch may cease feeding and move to clearer water until sediment levels return to background levels. Increased turbidity levels may disrupt normal behavioral patterns and cause stress for the logperch. The released sediment will temporarily reduce the suitability of habitat within the area 5 miles downstream of the dam and logperch may avoid these affected areas. These effects may persist in areas immediately downstream of the dam due to the deposited sediments and logperch that are unable to move out of the area will experience stress due to loss of habitat for breeding, feeding, and sheltering.

Logperch will be affected after dam notching when the river channel reconfigures to the new conditions in the area 5 miles downstream of the dam. Both temporary and permanent geomorphic changes will occur to the river (Kris Bass Engineering 2015) as a result of the proposed dam notching and subsequent sediment release. We expect effects of sediment in the channel from 5 miles below Power Dam to Leesville Lake will be minor and will not result in any changes from the river's current condition (Kris Bass Engineering 2015). After the initial release of sediment when the dam is notched, it is anticipated that some sediment will remain stored. This remaining stored sediment is expected to be released in pulses over time during stormflow events. A 10-year or greater flood event will have greater flushing ability and sediment is expected to travel during most storm events to Leesville Lake (Kris Bass Engineering 2015). Additional flow from tributaries such as Big Chestnut and Snow Creek will increase water volume which will facilitate sediment transport in the lower reach of the Pigg River (Kris Bass Engineering 2015).

Release of sediment will cause permanent morphological changes to the channel resulting in more diverse and complex habitat features over time. Over the course of several years, scouring, sediment transport, and deposition will occur during high-flow events. As these changes occur, some areas will be scoured and some will be subjected to sediment deposition. Over time, sediment deposition and channel narrowing will result in a greater sediment balance, connection with the floodplain, and improve habitat complexity (Kris Bass Engineering 2015). This channel improvement will improve habitat for the logperch and will allow access to other habitats previously unavailable to logperch due to the presence of the dam. Roberts et al. (2014) indicates that logperch are very mobile and determined that median lifetime dispersal distance is 3.7 to 15

miles. Therefore we expect that most adult logperch will have the ability to avoid areas of heavy sediment deposition in the river and move to other areas of suitable habitat within the Pigg River system as the sediment moves within the channel. Younger life stages may not be able to move out of the area and will experience loss of habitat for breeding, feeding, and sheltering.

Interrelated and Interdependent Actions – An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. The Service is not aware of activities interrelated to or interdependent with the proposed action at this time.

Beneficial Actions – Based on genetics and movement data, Roberts et al. (2009) recommended that man-made barriers be removed for the logperch whenever possible. Logperch habitat connectivity (75 miles of unobstructed habitat) and hydrologic and geomorphic processes will be restored, and the impounded area will revert to stream habitat once the dam is notched.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. The Service is not aware of any future State, tribal, local, or private actions within the action area at this time.

CONCLUSION

There will be adverse effects to logperch from habitat disturbance, sedimentation, and channel alteration. The duration and severity of these adverse effects are limited and conservation measures have been incorporated into the proposed action to minimize these effects. Notching of the dam is expected to improve population connectivity and habitat complexity and benefit the logperch population in the Pigg River over the long-term.

After reviewing the current status of logperch, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Pigg River restoration at Power Dam, as proposed, is not likely to jeopardize the continued existence of the logperch. No critical habitat has been designated for this species; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined

as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be undertaken by the Service's PFW Program so that they become binding conditions of any grant or permit issued to them, as appropriate, for the exemption in action 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to require the PFW Program to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Service's PFW Program must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The action area within the Pigg River is 75 miles in length due to the restoration of habitat connectivity; however, incidental take of logperch will only occur in a small portion of the action area. We do not anticipate incidental take upstream of the dam in either the impounded area (no suitable habitat present) or upstream of the impoundment (suitable habitat, but no effects from sediment deposition). We do not anticipate incidental take of logperch from 5 miles downstream of the dam to Leesville Lake.

Hitt et al. (2009) estimated that the study area (Sites A, B, and C) had a population size of 167 logperch. Based on this estimate minus the upstream site data (Site A), we estimated that 127 logperch occurred in a 1-mile stretch downstream of the dam. Since we did not have site-specific data we estimated, based on a population viability analysis study (Roberts 2014), approximately 150 logperch per mile (miles 1 to 5 downstream of Power Dam).

The Service anticipates incidental take of logperch will be difficult to detect because the logperch is relatively small and finding a dead or impaired specimen is unlikely. We anticipate incidental take of logperch during project construction and for a short period of time after project completion. Stress, short-term reproductive impairment, injury, and mortality are expected

during and after dam notching due to instream construction, sedimentation, scouring, and changes in river hydrology and morphology. Temporary habitat loss or decreased habitat suitability are also expected after dam notching as the stream channel achieves a new equilibrium due to sedimentation and scouring.

The Service anticipates 63 logperch could be taken in the footprint of the temporary causeway (2,075 ft²) due to the placement of fill and instream work and within a 1/2 mile downstream of the dam due to sediment deposition. We expect logperch in this part of the action area to face the highest risk of death, injury, or stress due to their proximity to the dam. The incidental take is expected to be in the form of injury and death.

Sediment deposition and scouring are expected to diminish with increasing distance from Power Dam and over time so incidental take for these effects was estimated at distance below the dam: 0 to 1 mile, 1 to 3 miles, and 3 to 5 miles. The Service anticipates take of an additional 64 logperch within 0 to 1 mile below the dam, 150 logperch from 1 to 3 miles below the dam, and 75 logperch from 3 to 5 miles below the dam from sedimentation and subsequent habitat alteration. The incidental take is expected to be in the form of harassment (Table 2).

Table 2. Logperch incidental take estimates.

Site Distance downstream of Power Dam	Estimated Number of Logperch	Estimated Incidental Take (number of individuals)	
		Injury and death due to sediment deposition	Harassment due to sedimentation
Dam to 1 mile	127	63 (50 percent of 127)	64 (50 percent of 127)
1 to 3 miles	300	0	150 (50 percent of 300)
3 to 5 miles	300	0	75 (25 percent of 300)
Total	727	63	289

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes that all reasonable and prudent measures necessary and appropriate to minimize take of logperch have been incorporated into the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the ESA, the Service's PFW Program must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. Notify the Service 1 week before initiation of construction and no more than 1 week after project completion at the contact email address provided below.
2. Provide the monitoring plan with methodology that includes permanent surveyed channel cross sections, pebble counts, photography stations, sediment monitoring, and instream habitat quality assessments to the Service at the contact email address provided below within 3 months from the date of issuance of the Corps permit.
3. Take photos of the project site including the river channel, and the full extent of the construction area, prior to, at least once during construction, and at completion. All photos must be submitted to the Service in digital format at the contact email address provided below, within 7 calendar days following the site visit.
4. Provide the results of the annual qualitative and quantitative monitoring to the Service at the contact email address provided below within 30 calendar days of completing each annual monitoring report.
5. Care must be taken in handling any dead specimens of proposed or listed species to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the Service to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective. Upon locating a dead specimen, notify the Service's Virginia Law Enforcement Office at 804-771-2883 and the Service's Virginia Field Office at 804-693-6694.

The Service believes that no more than 352 logperch will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to

minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- Continue riparian and stream restoration throughout the logperch range to limit siltation and nutrient releases into receiving waterways. Such efforts are currently underway on the Pigg and upper Roanoke Rivers and should be augmented to cover such waterways as the Roanoke River below Leesville Dam, Goose Creek, and Little and Big Otter Rivers.
- Continue to identify and remove manmade barriers to fish passage.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions, please contact Kimberly Smith of this office at (804) 824-2410 or via email at Kimberly_Smith@fws.gov.

cc: Corps, Floyd, VA (Attn: Danielle Courtois)
VDCR, DNH, Richmond, VA (Attn: René Hypes)
VDEQ, Roanoke, VA (Attn: Jay Roberts)
VDGIF, Blacksburg, VA (Attn: Mike Pinder)
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