

# Mitigation Narrative

PPL Bell Bend Nuclear Power Plant  
Salem Township, Luzerne County, PA

## 1. Introduction and Purpose

Throughout the site selection and planning phase for the BBNPP project, steps were taken to avoid and minimize environmental impacts. The purpose of this section is to describe the unavoidable remaining impacts and the proposed mitigation projects to fulfill agency compensatory mitigation requirements.

## 2. Summary of Unavoidable Impacts

Since the initiation of the planning and design of BBNPP, PPL has advanced numerous iterations of the layout and design of BBNPP with the goal of avoiding wetland and stream features. Initial BBNPP layouts included possible impacts to wetlands and streams totaling over 100 ac. In subsequent design iterations direct impacts were reduced to approximately 60 ac in 2008 and then to approximately 30 ac in 2009. In late 2009, a decision was made to move BBNPP substantially north (approximately 900 feet) to an area with fewer wetlands. This major design change resulted in a site footprint with less than 10 ac of total wetland impact. The evolution of the site layout to avoid and minimize wetland and stream impacts is shown and discussed in detail in Section Q of this JPA.

While wetland impacts were substantially reduced, they could not be avoided entirely due to topography and siting requirements of plant components. Following the major shift in the project location additional adjustments were then made to decrease the size of the required temporary and permanent facilities, and to maximize the amount of undisturbed vegetation. These additional efforts resulted in the reduction of permanent impacts from approximately 10 ac to less than 2 ac of permanent impacts requiring mitigation, the majority of which is associated with the cooling water intake system (CWIS).

The following summarizes the remaining wetland and stream impacts anticipated as a result of construction of BBNPP. Both impacts and mitigation are evaluated both quantitatively (disturbed and compensated acreage and stream length) and qualitatively (lost and gained functions and values). Each impact is identified by a letter and each wetland is identified by a number. Wetland and Watercourse Impact Tables, included in the Environmental Assessment, Section J, Part 2, Enclosures D3 and D4, provide a breakdown

of acreages associated with each impact. Each impact letter and wetland identification number can be located on the "Wetland and Watercourse Impact Location Map" also provided in the Environmental Assessment (Enclosures D1 and D2). Impacts to wetlands and streams resulting from the BBNPP have been categorized as permanent, temporary, and indirect. Each impact is described in detail in the Environmental Assessment (Section J, Enclosure D). A summary of impacts is provided below.

## **2.1 Permanent Wetland and Stream Impacts**

Permanent impacts are characterized by the placement of fill or grading in a wetland or any structure or activity which changes, expands or diminishes the course, current or cross section of a watercourse, floodway or body of water (obstructions or encroachments).

Permanent wetland impacts resulting from the BBNPP are primarily caused by bridge and utility crossings as well as fill placement to construct and grade around plant infrastructure. Differences between Pennsylvania Department of Environmental Protection (DEP) permanent wetland impact acreage and the United States Army Corp of Engineers (ACOE) permanent wetland impact acreage include isolated wetland impacts and bridge spans. Isolated wetlands do not fall under ACOE jurisdiction, but are regulated by DEP. Bridge spans over wetlands and streams are considered permanent impacts by DEP however ACOE only considers the pier footings placed within the wetland a permanent impact.

Seven bridges or crossings resulting in permanent wetland or stream impacts will be constructed over streams and/or wetlands for vehicle use, rail use, or utility crossings (Impacts A, B, C, D, E, F, G). Five of these bridges will permanently impact wetlands. These bridges were designed to minimize wetland impacts. They will span the entire width of the wetland; therefore only the bridge piers will be physically touching the wetlands. The only crossing resulting in physical alteration of the stream is Impact G, which is a culvert crossing the unnamed tributary to Lake Took-A-While for rail access to the project site. No permanent wetland impacts will result from impact G.

Impacts I, K, and M involve placing fill in wetlands. Impact I requires filling a small isolated wetland (DEP jurisdiction only) to create suitable grading around the power block in accordance with NRC design requirements. Impact M requires placing fill in two small wetlands to expand the existing SSES switchyard. One of these wetlands is isolated (DEP jurisdiction only). Impact K, BBNPP intake structure construction, results in the largest

wetland and stream impacts. The proposed intake structure is located on the North Branch Susquehanna River (NBSR) at the existing North Branch Canal (NBC) outfall channel (a manmade channel carrying weir controlled flow from the NBC to the NBSR). This manmade channel and adjacent wetlands will be filled to construct the intake structure. The canal outfall channel will be eliminated, and flow from the NBC that was previously directed to this channel will be re-directed to the downstream reach of the NBC that will be restored as part of the mitigation strategy. The reach of the outfall channel that will not be filled will be converted to wetlands.

## **2.2 Temporary Wetland and Stream Impacts**

Temporary impacts result from disturbances necessary to perform work where the temporarily disturbed area will be restored to its original grade and hydrology. Because temporary impacts will be restored to their original grade, wetland replacement acreage is not required; however, these impacts must still be avoided and minimized to the greatest extent practicable.

Agency differences in temporary impacts are limited to the proposed bridge footprints. DEP identifies these footprints areas as permanent impacts. ACOE temporary impacts for bridge construction will primarily be contained within the shadow of the bridge span and result from excavation and crane pad construction. The routing of underground intake and blowdown lines through wetlands at the Susquehanna Riverlands and the NBC will also cause temporary impacts (Impact M). After installation all temporarily impacted wetlands will be restored to their original grade and will be seeded with a wetland mix.

Construction dewatering (Impact L) will temporarily impact the hydrology of the Tributary 1, Tributary 2 and adjacent wetlands to Walker Run. Construction of the ESWEMS will require dewatering to support completion of construction under dry conditions. This will be a long-term temporary impact (up-to 2 years). A detailed "Construction Dewatering Mitigation Plan," attached to this narrative, has been developed to mitigate for these impacts.

## **2.3 Indirect Wetland and Stream Impacts**

Indirect impacts result when there is no physical obstruction or encroachment, but changes to vegetation, hydrology, or other factors may alter the functions or values of a wetland. In these cases, the overall wetland location and acreage is not affected, but the lost functions and values must be considered and mitigated. A Functions and Values Assessment was performed to identify the functions and values of all wetlands within the BBNPP project boundary and was used as a basis to determine indirect wetland impacts. Most indirect impacts caused by the construction of the BBNPP are related to habitat changes resulting from tree removal. The "Functions and Values Assessment" is included in Appendix B.

Most of the structures previously discussed which are causing temporary impacts also create indirect impacts resulting from tree removal. The installation of bridges will require the permanent removal of trees to provide clearance for the bridge span and vegetation controls along rights-of-way (Impacts B, C, D, E, and F). The installation of underground intake and blowdown lines will require the permanent removal of trees for security purposes and to maintain the integrity of underground pipelines (Impacts M). Tree removal will minimally affect the wildlife habitat function of the wetlands.

Transmission line construction will only result in indirect impacts (Impacts P, Q, and R). Permanent tree removal will be required to provide clearance for the overhead lines and rights-of-way. Tree removal will affect the wildlife habitat function of the wetlands. The lines will span the entire width of the wetland and therefore no permanent or temporary impacts will result.

## **2.4 Water Use Impacts**

Physical impacts of cooling system water withdrawal from the NBSR could include alteration of site hydrology at, and in areas downstream of, the intake structure. The maximum pumping flow rate from NBSR for BBNPP is expected to be 28,179 gallons per minute (gpm). BBNPP makeup water withdrawal rate during normal operations represents less than 1% of average annual Susquehanna River flow and approximately 5% of the 7Q10 low flow as measured at the USGS Wilkes-Barre Gage. Studies have been completed to determine if BBNPP water use will have a negative effect on aquatic habitat, vulnerable aquatic species, and water quality, especially during drought or low flow conditions. Mitigation of potential aquatic impacts during low flow periods is a requirement

of the SRBC and is being separately addressed as part of the Commission's regulatory review.

## **2.5 Tree Removal Impacts**

In addition to deforestation in wetlands, upland forested wildlife habitat will be significantly affected by BBNPP construction. Approximately 234 acres of forest will be cleared, of which approximately 224.5 acres is upland and 9.51 acres is wetland. Tree clearing will cause increased fragmentation of forested habitat. More specifically, tree clearing will impact potential Indiana bat habitat. The Indiana bat is a federally-listed endangered species.

## **2.6 Impacts to Threatened and Endangered Species and Species of Special Concern**

Species that could potentially be impacted by the construction of the BBNPP include the Indiana bat and two mussel species (the Yellow Lampmussel and Green Floater), the Baltimore Checkspot butterfly and the Mulberry Wing butterfly. Tree clearing could decrease available roost tree habitat for the Indiana bat. Although suitable habitat exists, the Indiana Bat has not been identified within the Project Boundary. Dredging in the NBSR for intake and blowdown line construction could affect the listed state protected mussel species. The Yellow Lampmussel is widely distributed and will not be affected by the limited area of disturbance needed for intake structure dredging. The green floater is more likely to be found in hydrologically stable streams, not those prone to flooding and drying. While the intake structure will be constructed in a calm pool, the depth and substrate in this area make impacts to Green Floater habitat unlikely. PPL is coordinating with the PA Fish and Boat Commission and will obtain clearance before dredging commences. Impacts to the Baltimore Checkerspot are unlikely because its host plant, turtlehead (*Chelone glabra*) was not found in the wetlands at the BBNPP site. Neither of these butterfly species has been sighted within the BBNPP project boundary.

### **3. Mitigation Strategy for Permanent and Indirect Impacts**

The objective of the proposed mitigation strategy is to provide compensatory mitigation in accordance with the 2008 ACOE Final Compensatory Mitigation Rule. This strategy will fully mitigate for the impacts described above in Sections 2.1 - 2.3 to Waters of the Commonwealth and Waters of the U.S. The mitigation projects will also incorporate measures that address additional habitat impacts as described above in Sections 2.4 - 2.6. All proposed wetland and stream mitigation projects involve an on-site and primarily in-kind permittee-responsible watershed approach. At the time of mitigation planning, there was no wetland banking opportunities or in-lieu fee programs available in Pennsylvania.

Numerous potential mitigation sites were evaluated for compensatory stream and wetland mitigation for the BBNPP project impacts. PPL will implement three of these stream and wetland mitigation projects that were selected based on the mitigation project's ability to satisfy the wetland mitigation acreage needed for the proposed impacts, to replace functions and values affected by the proposed impacts, and to provide the greatest environmental benefits relative to the expected cost of the mitigation measure. The chosen mitigation projects are also intended to address watershed and site specific concerns such as replacement of forested wetland habitat and habitat quality improvements for reproducing brown trout populations in Walker Run. Reports documenting assessments of the existing conditions within Walker Run are included in Appendix B of the JPA. The following projects will be implemented as part of the BBNPP mitigation strategy for impacts to jurisdictional waters:

1. Complete a stream and floodplain restoration project on two reaches of Walker Run creating and enhancing wetlands and wild trout habitat as well as mitigating for permanent stream impacts.
2. Remove a section of Confers Lane, which is to be abandoned, creating additional wetlands and restoring a hydrologic connection between two EV wetlands.
3. Restore the North Branch Canal, enhance wetlands at the PPL Riverlands near the proposed intake structure, and extend the existing recreational trail system.

These projects were designed to work within the context of the site to re-establish ecological connections and restore historic hydrologic conditions. This design approach provides stable, longer lasting results and multiple self-sustaining environmental benefits. All enhanced and created wetlands resulting from these mitigation projects will be in-kind

except for the small amount of emergent wetland impacts which will be mitigated with the creation of PFO. The prioritization and establishment of PFO wetlands has been identified by review agencies as an important aspect of mitigation projects on this site. The projects are summarized below. Detailed project descriptions including existing site conditions, design objectives, and methodology can be found in the attached Design Reports and plan sets.

### **3.1 Walker Run Stream and Floodplain Restoration**

The Walker Run mitigation project has been the centerpiece of the mitigation strategy from early in the planning process. This proposed project will use natural stream channel design techniques to improve channel stability, water quality, and aquatic habitat along Walker Run and to restore the functionality of the floodplain.

Two separate segments of stream channel will be restored:

- 1) Site A – beginning at the Beach Grove Road bridge and ending at the upper North Market Street bridge; and
- 2) Site B – beginning at the upper North Market Street bridge and ending at the confluence with the Tributary 1 to Walker Run.

The existing habitat within these reaches scored marginal using EPA rapid bioassessment protocols, and poor when using a separate substrate composition and analysis survey (high substrate embeddedness, low gravel and cobble substrate composition). The proposed project will greatly improve Walker Run's habitat, especially for reproducing brown trout populations. Sedimentation and stream bank erosion will also be reduced, improving availability of trout spawning substrate. Varying in-stream conditions including riffles, runs, and pools, as well as fish habitat structures will be established, and eventually a mature PFO wetland will exist along the length of the restored reach improving canopy cover and reducing stream temperatures.

The Walker Run stream and floodplain restoration will account for all of the required wetland mitigation for the BBNPP impacts. The project will create 7.87 ac of wetlands and enhance an additional 5.5 ac through invasive species removal and the planting of native herbaceous vegetation, shrubs, and trees. The project will also re-establish the connection between Walker Run and its floodplain to improve hydrology.

The planting plan for this project was designed with the goal of eventually establishing mature Palustrine Forested (PFO) wetlands to mitigate for losses to forested wetland habitat, including Indiana bat habitat, resulting from permanent and indirect impacts. The functions provided by these wetlands will exceed the functions lost by BBNPP project impacts and will include; enhanced fish habitat, stream stabilization, groundwater recharge, sediment reduction, floodflow alteration, and water quality improvements.

The Walker Run mitigation project will also account for all of the required stream mitigation for BBNPP impacts. The existing straightened and channelized stream will be realigned, creating and enhancing a total of 2,213 LF of channel. Stream channel is created where the existing channel is moved and lengthened. A total of 1,360 LF of created stream channel and 853 LF of enhanced channel will result from the Walker Run mitigation project. Stream enhancements occur where the stream remains in its existing location but channel improvements are made such as bank grading or planting native vegetation.

The implementation of the Walker Run mitigation project will cause permanent wetland and stream impacts; however, these impacts are small compared to the overall benefit. The wetland impacts result at locations where the proposed stream channel has displaced existing wetlands. Stream impacts occur where the existing channel is abandoned. The net mitigation totals created by the Walker Run mitigation project will replace impacted wetland acreages and stream lengths resulting from BBNPP.

### **3.2 Riverlands – North Branch Canal Restoration**

The Riverlands Mitigation Project is two-fold. First, the NBC will be reconnected in its historical alignment. Second, 1.24 acres of wetlands will be enhanced near the proposed intake structure.

The reconnection of the NBC has been identified as the preferred solution to address the proposed filling of the existing manmade NBC outfall channel in conjunction with the intake structure construction. The NBC outfall channel was installed to provide an outfall to the canal weir which is intended to maintain water surface elevation in the canal. The reconnection also includes plans for a walking trail along the old tow path for the length of the restored canal. The reconnection of the canal will mitigate for the wetland values lost from Impact K such as recreation, educational opportunities, uniqueness, and visual quality.

This project will also enhance 1.24 acres of wetlands near the proposed intake structure. The planned enhancement will include removing invasive species and planting native herbaceous species, shrubs, and trees to compensate for reduced PFO habitat.

### 3.3 Confers Lane Removal/ Wetland Creation

Existing wetlands on either side of Confers Lane are hydrologically similar and were likely connected prior to road construction. The abandonment of Confers Lane presents an opportunity to remove the road bed, re-establish a connection between existing EV wetlands, and create 0.36 ac of additional forested wetland habitat. This small area will be enhanced with native herbaceous plants, shrubs and trees to restore the PFO wetland post construction.

### 3.4 Summary of Mitigation for Permanent Impacts

A summary table of the wetland and stream mitigation resulting from all three proposed projects is provided below. All created and enhanced wetlands will be planted with trees to replace impacted PFO habitat.

**Table 1. Total Mitigation**

	Wetlands Enhanced (ac)	Wetlands Created (ac)	Net Stream Channel Created (LF)	Stream Channel Enhanced (LF)
Walker Run	5.52	7.87	1360 ft	853
Riverlands	1.24	0	0	0
Confers Lane	0.04	0.36	0	0
Total	6.80	8.23	1360 ft	853

### 3.5 Performance Standards

Important components of each mitigation project including created wetlands, enhanced wetlands, stream channel stability and riparian corridor habitat will be evaluated to determine if the following performance standards are achieved.

1. Created and enhanced wetlands will meet the criteria of a wetland by exhibiting appropriated hydrology, soils, and vegetation as specified in the ACOE North Central and Northeast Regional Supplement.
2. Created and enhanced wetlands will support a dominance of native wetland vegetation.
3. Tree survival rate within the created and enhanced wetlands will be 70% or greater.
4. Walker Run will maintain a stable geometry post-restoration and the improved in-stream habitat will support a reproducing brown trout population.

### **3.6 Monitoring Plan**

All monitoring activities will be in compliance with permit conditions. Each mitigation project site will be monitored on an annual basis. Monitoring will include documentation of created and enhanced wetland hydrology, soil profile, and vegetation on a "Wetland Determination Data Form" included in the Northcentral and Northeast Regional Supplement. These wetland monitoring locations, once established, will remain the same for the length of the monitoring. Monumented photograph locations will also be established at each of the project sites to document wetland and stream channel conditions. The presence and location of any invasive species will be noted and appropriate control measures taken. Stream geometry and stability at the Walker Run mitigation site will be documented through the yearly survey of monumented cross sections that can be compared to the as-built survey. Any stability issues will be promptly corrected. In addition, benthic macroinvertebrate and fish assessments will be performed. These monitoring activities are identified in the Walker Run Trout Enhancement Plan (LandStudies, 2010) provided in Appendix B of the JPA.

### **3.7 Maintenance Plan**

The Applicant will maintain the mitigation sites to encourage the growth of native wetland vegetation, control invasive species, and promote tree survival. Periodic mowing and herbicide applications will be utilized during the establishment phase to promote healthy growth of native vegetation. Maintenance of the mitigation projects will also incorporate any issues and recommendations identified during monitoring activities.

### **3.8 Long Term Management and Adaptive Management**

The Applicant will be responsible for the long-term management and adaptive management of the mitigation sites to ensure their continued success after the performance standards are initially met. Long-term management will include continued control of invasive species populations. Should site conditions change, negatively affecting the intended functions and success of a compensatory mitigation project, the Applicant will work with a consultant to identify issues hindering project success and develop and implement solutions that will achieve the permitted mitigation requirements.

### **3.9 Financial Assurances**

The Applicant is an ideal candidate for permittee-responsible mitigation. PPL has sources of loans and funding from government and private organizations during construction. The NRC requires financial assurances from the PPL for the life of the facility including decommissioning at the end of its life-cycle.

## **4. Numerical Impact Summary for Jurisdictional Waters**

Both DEP and ACOE require that wetland acreage be created or enhanced to compensate for permanently impacted wetlands. Temporary impacts do not require compensatory mitigation since they will be returned to their original condition. DEP and ACOE use different mitigation ratios to calculate minimum wetland replacement acreage. ACOE requires 2:1 for Palustrine Forested (PFO) wetlands, 1.5:1 for Palustrine Scrub Shrub (PSS), and 1:1 Palustrine Emergent wetlands (PEM). PADEP requires a minimum 1:1 mitigation for all wetland classifications (PFO, PSS, and PEM). Stream impacts also require a 1:1 mitigation ratio. The mitigation strategy will compensate for the following amounts of permanent wetland and stream impacts as well as indirect wetland impacts.

### **4.1 Permanent Impact Acreage**

A summary of total wetland impacts, mitigation requirements and mitigation amounts for DEP and ACOE are provided in Tables 2 and 3, respectively. Permanent impacts resulting from bridge construction ranges from 0.01 to 0.09 ac each (ACOE jurisdiction) and 0.05 to 0.55 ac (DEP jurisdiction). Filling two small wetlands (Impacts I and J) will result in a total of 0.04 ac (ACOE) and 0.18 ac (DEP) of permanent impacts. Intake structure construction (Impact K) is the largest permanent wetland impact at 0.98 ac. Impact K will also cause the

elimination of 617 LF of the NBC outfall channel. Construction of a culvert crossing for rail tracks will create 125 LF of permanent stream impacts. Permanent stream impacts from BBNPP construction will total 742 LF (ACOE). The Walker Run Mitigation Project will create 0.33 ac of permanent wetland impacts and 2799 LF of stream impacts that are included in the calculation of net wetland and stream gained. The wetland impacts result at locations where the proposed stream channel displaces existing wetlands. Stream impacts occur where the existing channel is abandoned. All planned wetland mitigation will create PFO habitat to compensate for indirect impacts and create forested wildlife corridors; therefore there will be a net loss of PEM wetland as shown in Tables 2 and 3.

**Table 2. Summary of Wetland Impacts and Mitigation Requirements for DEP**

<b>DEP Impacts and Mitigation Summary</b>	<b>PFO</b>	<b>PSS</b>	<b>PEM</b>	<b>Total Wetland</b>	<b>Total Stream</b>
	<b>(ac.)</b>	<b>(ac.)</b>	<b>(ac.)</b>	<b>(ac.)</b>	<b>(lf)</b>
Project Impacts	1.58	0.00	0.88	2.57	997
Project Impacts Requiring Mitigation*	0.51	0.00	0.88	1.39	742
<b>DEP Minimum Mitigation Requirement (1:1)</b>	<b>0.51</b>	<b>0.00</b>	<b>0.88</b>	<b>1.39</b>	<b>742</b>
Wetland Creation and Stream Creation/Enhancement	8.56	0.00	0.00	8.56	5012
Mitigation Impacts	0.08	0.00	0.25	0.33	2799
<b>Net Wetland Creation and Stream Creation/Enhancement**</b>	<b>8.48</b>	<b>0.00</b>	<b>-0.25</b>	<b>8.23</b>	<b>2213</b>
<b>Net Gain</b>	<b>7.97</b>	<b>0.00</b>	<b>-1.13</b>	<b>6.85</b>	<b>1471</b>

\*Although DEP considers the entire bridge span a permanent wetland and stream impact, mitigation is only required for the bridge piers.

\*\*DEP does not count wetland enhancement towards mitigation acreage.

**Table 3. Summary of Wetland Impacts and Mitigation Requirements for ACOE**

<b>ACOE Impacts and Mitigation Summary</b>	<b>PFO</b>	<b>PSS</b>	<b>PEM</b>	<b>Total Wetland</b>	<b>Total Stream</b>
	<b>(ac.)</b>	<b>(ac.)</b>	<b>(ac.)</b>	<b>(ac.)</b>	<b>(lf)</b>
Project Impacts	0.51	0.00	0.74	1.25	742
<b>ACOE Minimum Mitigation Requirement (2:1 PFO, 1.5:1 PSS, 1:1 PEM)</b>	<b>1.02</b>	<b>0.00</b>	<b>0.74</b>	<b>1.76</b>	<b>742</b>
Wetland and Stream Creation and Enhancement	15.36	0.00	0.00	15.36	5012
Mitigation Impacts	0.08	0.00	0.25	0.33	2799
<b>Net Wetland Creation and Stream Creation/Enhancement</b>	<b>15.28</b>	<b>0.00</b>	<b>-0.25</b>	<b>15.03</b>	<b>2213</b>
<b>Net Gain</b>	<b>14.26</b>	<b>0.00</b>	<b>-0.99</b>	<b>13.28</b>	<b>1471</b>

## 4.2 Temporary Impact Acreage

### 4.2.1 Physical Temporary Impacts

Temporary impacts resulting from excavation and grading around bridge piers will total 0.99 ac (DEP) and 2.18 ac (ACOE). The discrepancy in acreage results from the area of the bridge spans which DEP designates a permanent impact. Installation of the intake and blowdown pipelines result in 0.78 ac of temporary impact. All temporarily impacted areas will be returned to their original grade following disturbance activities and seeded with a wetland seed mixture. These activities do not require additional mitigation activities.

Additional stream temporary impacts result from Impact H, the replacement of the tear-drop wetland drainage culvert (567 LF); Impact M where the intake and blowdown lines cross the NBC (47 LF); and the NBSR river dredging for the intake forebay and the blowdown diffuser pipe (270 LF). These activities do not require additional mitigation activities.

### 4.2.2 Hydrologic Temporary Impacts

Dewatering for the construction of the safety-related structures may result in localized reductions in groundwater elevations, constituting a temporary wetland impact. To minimize this impact, preconstruction monitoring of baseline conditions will be conducted, a temporary irrigation system will be installed to maintain baseline conditions during construction, and post-construction monitoring will be completed to ensure natural hydrology returns to the wetland. About 5.6 ac of Wetlands 11 and 12 will be irrigated as needed with the extracted groundwater through a sprinkler system. Pipes will also facilitate

flow of the extracted water to about 1400 LF of Tributary 1 to Walker Run and Tributary 2 that may be impacted.

To effectively determine mitigation needs, baseline monitoring of hydrologic conditions within the zone of influence of pumping is required. A series of shallow piezometers and soil moisture monitoring devices will be installed in strategic locations and data collected for a minimum of two to three years will be used to complement data from existing flow gages and monitoring wells at BBNPP. Normalized with actual meteorological data inputs, this record of information will serve to determine volumetric and temporal mitigation needs during the pumping period.

Mitigation measures will include introduction of water to affected wetlands from one or more storage reservoirs constructed on the site to store pumped groundwater. Application of stored water will be completed by a sprinkler irrigation system, and continued monitoring of the wetlands will be completed to allow real-time flow corrections to maintain conditions reflecting the baseline.

Post construction evaluation of affected wetlands will be completed to determine if any additional restoration activities are required to offset any unintended impacts. In the unlikely event that the hydrology would not be restored to the affected wetlands following construction, the additional created wetland area provided exceeds the total area of wetlands that would be potentially affected by this impact. The compensatory mitigation program for BBNPP includes measures provided to offset any loss of function and value of affected wetlands during the period of impact from groundwater withdrawal. The entire "Construction Dewatering Mitigation Plan" is attached to this narrative.

#### **4.3 Indirect Impact Acreage and Function and Value Replacement**

Indirect impacts will affect 7.93 ac (DEP) and 9.00 ac (ACOE) of wetlands. Bridge construction will cause 1.93 ac (DEP) and 9.00 ac (ACOE) of indirect impacts. The difference in acreage results from the area of the bridge span which DEP designates as permanent impact. Indirect impacts resulting from intake and blowdown line installation total 0.07 ac and are also considered temporary. Transmission line construction and maintenance will create the greatest amount of indirect impacts, totaling 5.93 ac. The largest contiguous area of tree removal will occur within the "tear drop" wetland at Impact P where 3.46 ac of trees will be removed.

Any reduction in functions and values performed by indirectly impacting wetlands will also be replaced through the mitigation strategy. Cumulative PFO habitat loss is the greatest function affected by the proposed BBNPP. A total of 9.51 ac of PFO habitat will be cleared resulting in permanent, temporary, and indirect wetland impacts.

Impacts M, P, Q, and R will permanently change the type of wildlife habitat from PFO to PSS. Bridge impacts will result in both a permanent change in wetland cover from PFO to PSS (bridge spans) and temporary change in wetland cover (areas cleared for construction feasibility). Affects to wildlife habitat will be negligible from bridge construction since the impacted areas are a small portion of a large forested wetland complex. Impact K, a permanent impact associated with construction of the intake structure, will eliminate PEM and PFO habitat.

Impact K will also permanently impact the other functions and values provided by wetlands 43, 44, and the NBC outfall channel including floodflow alteration, fish habitat, recreation, educational value, uniqueness, and visual quality. The values associated with wetlands 43 and 44 are minimal because the wetlands are located along the access road to the SSES intake structure and not along a heavily used walking trail as many of the wetlands are within the Riverlands Recreation Area.

Fish habitat will also be affected by impact G, the railroad culvert crossing of the unnamed tributary to Lake Took-A-While.

The wetlands affected by Impact J do not perform any functions or values.

All other impacts will not affect wetland functions and values. Temporarily impacted PEM wetlands will recover their functions and values post construction. Table 4 quantifies acreages of impacted wetland functions and created or enhanced wetland functions resulting from BBNPP construction and planned mitigation.

**Table 4. Wetland Functions Impacted and Created or Enhanced**

<b>Wetland Function</b>	<b>Amount Impacted</b>	<b>Amount Created/Enhanced</b>
PFO Wildlife Habitat	9.51 ac	14.60 ac
Fish Habitat	742 LF	2213 LF
Groundwater Recharge	0 ac	15.28 ac
Floodflow Alteration	0.98 ac	15.28 ac
Sediment Reduction	0 ac	15.28 ac
Sediment/Shoreline Stabilization	0 LF	2213 LF

The quantification of wetland values is more subjective. 0.98 ac of wetland will be impacted at the PPL Riverlands that provides the following values: education, recreation, uniqueness, and visual quality. The existing wetland at the impacted area is not easily accessible therefore the ability of the wetland to provide these values is weak. The proposed walking trail and NBC restoration will maximize these values by providing easy access for people to enjoy recreation, the educational and historical values of the wetland and canal and the aesthetics of the area.

## **6. Mitigation for Additional Project Impacts**

### **6.1 Mitigation for Water Use Impacts**

PPL has been working with the SRBC to determine a suitable method or combination of methods to mitigate BBNPP's proposed use of water from the NBSR during low flow periods. Mitigation may include a passby flow requirement and/or the release of water from existing or future PPL developed storage assets. PPL continues to actively work with SRBC on a mutually acceptable and beneficial plan but does not expect to finalize a mitigation plan for the BBNPP until 2012.

### **6.2 Upland Forest Clearing Mitigation Plan**

PPL will reforest acreage both within and outside the site boundary to compensate for up to 234 ac of proposed forest clearing which includes 9.51 ac of PFO. PPL has identified priority areas for mitigation. Top priority includes the Walker Run mitigation site, crop fields north and east of Lake Took-A-While and west of the NBSR, and parcels on the east side of

the NBSR. The reforestation goal is to provide north/south flyways on both sides of the project boundary, along Walker Run, and on the east bank of the NBSR between the river and the existing railroad tracks. This reforestation plan will be implemented in conjunction with the Indiana bat mitigation plan.

### **6.3 Indiana Bat Mitigation Plan**

The NRC is the lead federal agency responsible for consultation under Section 7 of the Endangered Species Act with the United States Fish and Wildlife Service (USFWS) regarding federally listed threatened and endangered species. PPL is working cooperatively with the NRC and USFWS to develop a comprehensive mitigation and management plan for Indiana Bats. A multi-faceted mitigation plan is being prepared to compensate for the loss of potential Indiana bat habitat resulting from the tree clearing needed to support facility construction and grading. PPL expects to complete the development of the mitigation and management plan in 2011 at which point it will be filed for inclusion in the application record.

The mitigation plan will focus on ways to create, improve, and protect on- and off-site Indiana bat habitat.

PPL will create Indiana bat habitat through reforestation and will maintain/enhance Indiana bat habitat according to United States Fish and Wildlife Service (USFWS) guidelines. Lands within and outside the project boundary will be chosen with input from the USFWS. The reforestation and habitat conservation and management process will exceed specific pre-determined criteria to create suitable Indiana bat habitat.

Lastly, PPL will provide public outreach regarding the Indiana Bat and White Nose Syndrome through their environmental programming at the Riverlands Recreational Area and Wetland Nature Area.

### **6.4 Mitigation for Additional Species of Special Concern**

Additional mitigation may be required for the butterfly species and mussel species of special concern indentified by the Department of Conservation and Natural Resources and the Pennsylvania Fish and Boat Commission. PPL is discussing the project with these agencies to determine potential impacts to the protected species and whether mitigation is necessary.

## **7. Conclusion**

A total of 8.48 ac of wetlands will be created, 6.8 ac of wetlands will be enhanced, and 2213 feet of stream channel restored resulting in a net gain of 7.97 ac (DEP) and 14.26 ac (ACOE) of wetlands and 1471 LF of stream channel within the BBNPP property boundary. All impacted functions and values will be replaced. Additional wetland functions and values will be created exceeding those currently existing on the BBNPP site. The mitigation projects will create forested wetland habitat and improve habitat for reproducing wild trout populations within Walker Run. The proposed mitigation projects will exceed both DEP and ACOE mitigation requirements. PPL will satisfy additional Federal and State mitigation requirements by addressing impacts to endangered and protected species habitat.