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U. S. Nuclear Regulatory Commission  
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10 CFR 50.4

**SUSQUEHANNA STEAM ELECTRIC STATION  
2017 ANNUAL ENVIRONMENTAL OPERATING REPORT  
(NONRADIOLOGICAL)  
PLA-7690**

APR 10 2018

**Docket No. 50-387  
and No. 50-388**

The Susquehanna Steam Electric Station (SSES) Annual Environmental Operating Report (Nonradiological) is hereby submitted for the calendar year 2017 in accordance with the SSES Environmental Protection Plan (EPP), Section 5.4.1.

There are no new or revised regulatory commitments contained in this submittal.

Should you have any questions regarding this submittal, please contact Mr. Jason Jennings, Manager – Nuclear Regulatory Affairs, at (570) 542-3155.

A handwritten signature in black ink, appearing to be "Brad Berryman", written over a horizontal line.

Brad Berryman

Attachment: 2017 Annual Environmental Operating Report (Nonradiological) for SSES  
Units 1 and 2

Copy: NRC Region I  
Ms. T. E. Hood, NRC Project Manager  
Ms. L. H. Micewski, NRC Sr. Resident Inspector  
Mr. M. Shields, PA DEP/BRP  
Mr. R. Anderson, US Department of Interior, Fish and Wildlife Service

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**Attachment to PLA-7690**

**2017 Annual Environmental Operating Report  
(Nonradiological) for SSES Units 1 and 2**

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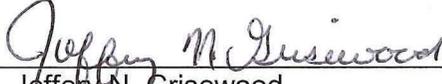
# SUSQUEHANNA STEAM ELECTRIC STATION

## ANNUAL ENVIRONMENTAL OPERATING REPORT (NONRADIOLOGICAL)

2017

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**Susquehanna Steam Electric Station  
Units 1 & 2**

**2017  
ANNUAL ENVIRONMENTAL OPERATING REPORT  
(NONRADIOLOGICAL)**

**Facility Operating License Nos. NPF-14 & NPF-22  
Docket Nos. 50-387 & 50-388**

**Prepared by  
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Berwick, PA  
April 2018**

## **FOREWORD**

The Susquehanna Steam Electric Station is a nuclear electrical generating facility with two boiling-water reactors and generators located just west of the Susquehanna River, approximately 5 miles northeast of Berwick, in Luzerne County, Pennsylvania. The station was constructed in the 1970's, with Unit 1 beginning commercial operation on June 8, 1983, and Unit 2 beginning commercial operation on February 12, 1985. Units 1 and 2 each generate a net 1,350 megawatts (MWe), for a total station output of 2,700 MWe.

In total Susquehanna Nuclear, LLC presently owns 2,347 acres of land on both sides of the Susquehanna River. Generally, this land is characterized by open deciduous woodlands interspersed with grasslands and orchards.

On the west side of the river, 1,605 (1670 minus 65 acre Gould Island) acres of land is jointly owned between Susquehanna Nuclear, LLC (90%) and Allegheny Electric Cooperative (10%). The land uses on the west side of the river include generation & associated maintenance facilities, laydown areas, parking lots, roads, a nature preserve (the Susquehanna Riverlands), and agricultural leases to local farmers.

To the north of the station along the river, Susquehanna Nuclear, LLC owns 100% of the 65-acre Gould Island. On the east side of the river, and across the river from the station, Susquehanna Nuclear, LLC is the 100% owner of 677 acres that are maintained as undeveloped land, natural recreational areas, wildlife areas, and leases to local farmers.

This report discusses environmental commitments and impacts from January 1, 2017 through December 31, 2017. In summary the report documents that Susquehanna Nuclear's environmental commitments were met and that there was no significant adverse environmental impact from station operation.

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## **1.0 OBJECTIVE**

The Licensee has developed procedures and guidelines to ensure that operation of Susquehanna Steam Electric Station (SES) does not adversely affect the environment in the vicinity of the station. Also, these procedures allocate responsibilities and define interfaces necessary to monitor environmental impacts. They include coordination of U.S. Nuclear Regulatory Commission (NRC) requirements with other federal, state, and local requirements for environmental protection.

The objective of this 2017 Annual Environmental Operating Report (Nonradiological) is to provide a summary of both environmental programs and procedures. This report is required by the Final Environmental Statement (FES) for the operation of the Susquehanna SES, Unit 1 and 2, NUREG-0564 June 1981, and Appendix B - Environmental Protection Plan (EPP) to Operating Licenses No. NPF-14 and No. NPF-22. The 2017 report is the 36<sup>th</sup> Annual Environmental Operating Report (Nonradiological) submitted to meet EPP requirements.

The Licensee submitted an Environmental Report-Operating License Stage for Susquehanna SES to the NRC in May 1978. This report reviewed the results of the preoperational environmental programs and described the preoperational and proposed operational environmental monitoring programs. The NRC and other agencies reviewed this report and made recommendations for operational environmental monitoring programs which were listed in the FES.

## 2.0 ENVIRONMENTAL ISSUES

### 2.1 Aquatic Issues

The aquatic monitoring program for operation of the Susquehanna SES is divided into two parts.

**Part 1** includes effluent monitoring required by a National Pollutant Discharge Elimination System (NPDES) permit issued by the Pennsylvania Department of Environmental Protection (PaDEP).

The PaDEP is responsible for regulating the water quality permit for the Susquehanna SES. The station's operational NPDES Permit No. PA-0047325 deals with discharge parameters for the Susquehanna SES Sewage Treatment Plant, Cooling Tower blowdown, and miscellaneous low volume waste discharges. The Cooling Tower blowdown also includes in-plant process streams which discharge to the Susquehanna River. Various low volume waste sumps discharge to the station's stormwater system, which flows into Lake Took-A-While, and eventually into the Susquehanna River. The permit requires the station to submit monthly Discharge Monitoring Reports for these outfalls to the PaDEP.

Susquehanna SES's NPDES Permit was reissued on September 1, 2011, and expired on August 31, 2016. The station submitted its NPDES Permit renewal application (PLE-025782) to PaDEP on February 9, 2016. PaDEP has since confirmed that the submitted renewal application was administratively complete, but has not yet provided the station a new NPDES Permit. Until a new permit is issued to the station, the conditions of the most recently expired NPDES Permit will apply.

NOTE: A copy of the NPDES Permit renewal application (PLE-025782) was provided to the NRC in 2016 as part of the submittal process.

**Part 2** of the aquatic monitoring program deals with programs listed in the FES, or recommended by the PaDEP or U.S. Fish and Wildlife Service.

#### American Shad

On 16 May, 2017, the Pennsylvania Fish and Boat Commission (PAFBC) stocked 281,160 American shad fry (*Alosa sapidissima*) in the Susquehanna River at Tunkhannock, PA. The stocking occurred at the Tunkhannock Park Boat Access, approximately 50 miles upriver from the Susquehanna SES. As a result, Environmental Lab personnel sampled the wash-water from the trash bars and traveling screens at the Intake Structure during August and September to see if any shad migrating downriver were impinged by the Susquehanna SES.

Fish sampling containers, made from aluminum-framed boxes sided with wire mesh, were suspended by jib cranes at the ends of each of the wash-water canals from the trash bars and traveling screens. The sampling containers were deployed from 1 August through 29 September, 2017, and checked daily (Monday-Friday). No American shad were collected during this period or during any previous sampling year. However, 86 fish of 14 other species were collected (Table 2.1-1). Most of these fish were juvenile smallmouth bass (*Micropterus dolomieu*) or channel catfish (*Ictalurus punctatus*; 36 specimens between the two species). Additionally, 38 Allegheny crayfish (*Orconectes obscurus*) were also collected, along with two eastern dobsonflies (*Corydalus cornutus*), one live American bullfrog (*Lithobates catesbeianus*), and one live common snapping turtle (*Chelydra serpentina*); both were released to the nearby riparian wetlands.

The location of the Intake Structure may deter migrating juvenile shad from approaching the intake. PAFBC shad researchers reported that juvenile shad avoid slow currents when migrating downriver. The Intake Structure is located on the west river bank in relatively slow current; therefore, the position of the intake could be a determining factor in not having observed American shad in any samples to date.

#### Biofouling Mollusk Monitoring

The biofouling mollusk monitoring program continued at the Susquehanna SES in 2017. The focus of this monitoring is to survey the Susquehanna River and the ESSW Spray Pond for the presence of live Asian clams (*Corbicula fluminea*) and zebra mussels (*Dreissena polymorpha*). This work is generally done by a combination of scuba diving, wading, and examination of natural or removed structures so that substrates in the river and the pond can be inspected.

Asian clams are now abundant in the Susquehanna River near the Susquehanna SES, and up until the fall of 2017, no zebra mussels had been observed in the river in the immediate vicinity of the plant. As indicated in a report to Susquehanna SES in October 2017, three live zebra mussels were collected along the shoreline of the Susquehanna River approximately 1,000 feet downstream of the SSES intake structure. This observation does not yet suggest an established adult population in the river; however, subsequent inspections of the river intake area will need to be performed following the May 2016 discovery of zebra mussels in Lake Took-A-While (a recreational lake owned by Talen Energy that is part of their Susquehanna Riverlands natural area).

Two of the ESSW pump house screens were removed this year for cleaning and examined for biofoulers, and three live zebra mussels were

found attached to the screens. A scuba inspection for biofoulers in the ESSW Spray Pond was done on July 10<sup>th</sup>, 2017, by divers from the Environmental Lab, and no live specimens were observed during that inspection.

At this time zebra mussels in the Susquehanna River do not appear to pose an immediate threat to station operation; however, monitoring continues for mussels in the ESSW Spray Pond, the river intake area, station cooling systems, and Lake Took-A-While.

## 2.2 Terrestrial Issues

### 2.2.1 Studies Previously Completed

Terrestrial environmental studies, including Cooling Tower Bird Impaction, were completed prior to 1989.

### 2.2.2 Sound Level Survey

Sound level surveys were conducted during pre-operation and operational periods and are completed. No noise complaints due to station operation received during 2017.

### 2.2.3 Maintenance of Transmission Line Corridors

Transmission line corridor vegetation maintenance and inspection records are maintained by PPL-Electric Utilities Vegetation Management and are available upon request. There were no adverse environmental impacts to transmission corridors reported in 2017. Records will be maintained for five years.

## 2.3 Cultural Resources Issues

Environmental Protection Plan actions required to satisfy Title 36, Code of Federal Regulations Part 800, relating to archeological sites were completed in 1987. The Advisory Council on Historic Preservation (ACHP), in accordance with 36 CFR 800.6 (a)(1), approved the NRC's determination of "no adverse effect" for archeological sites SES-3 (36LU15), SES-6 (36LU16), SES-8 (36LU49), and SES-11 (36LU51) located on the Licensee's property (NRC letter dated October 28, 1987, to ACHP).

As part of the determination-of-effect process, the Licensee committed to and is taking appropriate measures to mitigate impacts from station

maintenance and operation to sites 36LU15, 36LU16, 36LU49, 36LU51, 36LU43, and 36LU105. There was no impact to these sites from station maintenance and operation in 2017. Furthermore, station activities did not impact any previously unknown cultural resources in 2017.

## 3.0 **CONSISTENCY REQUIREMENTS**

### 3.1 Plant Design and Operation

In accordance with the Environmental Protection Plan (EPP), the Licensee shall prepare and record an environmental evaluation of proposed changes in plant design, operation, or performance of any test or experiment which may significantly affect the environment. Before initiating such activities, the Licensee shall provide a written evaluation and obtain prior approval from the Director, Office of Nuclear Reactor Regulation. Criteria for the need to perform an environmental evaluation include: (1) a significant increase in any adverse environmental impact previously evaluated by the NRC or Atomic Safety and Licensing Board, (2) a significant change in effluent or power level, or (3) a matter not previously evaluated which may have a significant adverse environmental impact.

The EPP requires that an environmental evaluation be completed and the NRC be notified if an activity meets any of the criteria. If the change, test, or experiment does not meet any of these criteria, the Licensee will document the evaluation and allow the activity to occur.

During operation of the Susquehanna SES in 2017, there were proposed activities that the Licensee reviewed as part of the Unreviewed Environmental Question program. None of these activities were determined to involve an Unreviewed Environmental Question or require prior NRC notification. The activities reviewed were:

1. Proposed change to Cooling Tower Basin Demucking PM Frequency
2. Excavation and Replacement of Fire Hydrant 2FH121
3. Excavation to support OPD Installation on T-10 Transformer
4. 2017 Stormwater O&M Work
5. Excavation to support Cathodic Protection Project

### 3.2 Reporting Related to NPDES Permits and State Certifications

There were no significant noncompliances or special reporting requirements associated with implementation of NPDES Permit No. PA0047325.

Since Susquehanna SES has an NPDES permit, state certification pursuant to Section 401 of the Clean Water Act is not required.

### 3.3 Changes Required for Compliance with Other Environmental Regulations

On January 27, 2017 PaDEP issued General Operating Permit GP11-40-010B to authorize the operation of temporary non-road engines needed to support the station's 2017 refueling outage.

On September 20, 2017 the Susquehanna River Basin Commission issued the station Docket No. 19950301-2, which approved increases to the station's daily maximum consumptive use and surface water withdrawal limits as requested under applications 2016-081 and 2016-082.

## 4.0 ENVIRONMENTAL CONDITIONS

### 4.1 Unusual or Important Environmental Events

During 2017, there were four operating occurrences reviewed as part of the Significant Environmental Event evaluation program.

1. On April 17, 2017 a Significant Environmental Event review was initiated due to a tree qualifying as Indiana bat habitat that had fallen in the vicinity of Susquehanna SES. This tree was located in Talen Energy's Susquehanna Riverlands / Wetlands Nature Area, just north of the Wetlands parking lot. The tree in question was a very large American beech (*Fagus grandifolia*). While this tree species is generally not considered a preferred roost tree for Indiana bats, this tree was in an advanced stage of decay and had a hollow trunk with a large split parallel to the trunk that could have provided bats access to its interior. Furthermore, as this tree fell, it upended a nearby tulip poplar tree (*Liriodendron tulipifera*). Both of the fallen trees posed a safety risk to station personnel and the public, so the trees were cut and removed from immediate vicinity of the trail. A biologist surveyed the trees both prior to and after tree removal and did not see any signs of bats in or near them.
2. On April 24, 2017 a Significant Environmental Event review was initiated due to the discovery of a bird nest atop a cooling fan of the T-10 transformer immediately north of the Circulating Water Pump House. The nest consisted of a loose aggregate of rather large nesting materials (long sticks and grasses) placed atop the cooling fan, some of which were falling through the fan guard into the area of the fan blades. The architecture of this early nest construction suggests the likelihood that the nest was being built by a Rock Pigeon (*Columbalivia*) The nest was monitored and no birds were observed visiting it. The conclusion was that the location of this nest and the materials comprising the nest presented a safety risk to the transformer equipment, personnel who might need to work with the transformer, and the birds that would inhabit this nest. Therefore, the nesting materials were removed immediately before the birds could complete and occupy the nest.
3. On May 8, 2017 the station received notification from Riverlands/ Wetlands maintenance personnel that numerous dead fish were present near the drainage area of the Wetlands Canal along Hicks Ferry Road. Upon investigation of the area by Environmental Lab personnel, numerous sunfish specimens were collected and returned to the environmental lab for enumeration and identification. Results indicated that this fish kill consisted of 95 Bluegills (*Lepomis*

macrochirus) and one White Crappie (*Pomoxis annularis*). There were no obvious signs of disease or trauma visible on the specimens, and given their proximity to the Wetlands Canal drain and the buildup of debris in the drain over the weekend due to heavy rain, it was concluded that the kill was likely due to the fish becoming trapped in a vortex of water that had been created by the debris and high flow. Maintenance personnel quickly cleared the debris and returned the drain to normal service. In order to ensure this fishkill was an isolated incident, Environmental Lab personnel investigated the 0.90 mile section of the canal spanning the area from the Hicks Ferry Road to the first bridge crossing the canal north of the River Intake Building's access road. The search yielded no additional fish specimens, confirming our conclusion that the fishkill found along Hick's Ferry Road was an isolated incident with no connection to station operation.

4. Between April 1<sup>st</sup> and November 16, bat inspections were conducted on 13 trees qualifying as Indiana bat habitat that had fallen in the vicinity of the station. These trees were located within Talen Energy's Susquehanna Riverlands/ Wetlands Nature Areas and most of them fell due to storm events, or because they were in advanced states of decay. Station management determined that the fallen trees posed a safety risk to station personnel and the public, so the trees were cut and removed from immediate vicinity of the trail. A biologist surveyed the trees both prior and after their removal with no signs of bats in or near them.

In summary, there were no significant or adverse environmental effects related to station operation, and there were no EPP noncompliances.

## 4.2 Environmental Monitoring

### 4.2.1 General Monitoring

With the exception of ongoing water quality monitoring required for compliance with the NPDES permit, all monitoring of station operational impacts on aquatic and terrestrial biota listed in the FES and Appendix B of the operating license have been completed.

### 4.2.2 Maintenance of Transmission Line Corridors

In 2017, PPL Electric Utilities Vegetation Management maintained transmission line vegetation maintenance and inspection records.

## **5.0 ENVIRONMENTAL PROTECTION PLAN REPORTING REQUIREMENTS**

### **5.1 Review and Audit**

The Licensee has established procedures for an independent group to review and audit compliance with the EPP. Audits of EPP compliance are conducted by Nuclear Oversight. The Manager-Nuclear Oversight is responsible for verifying compliance with the EPP. The Site VP – Susquehanna is responsible for environmental monitoring and for providing any related support concerning licensing. The Manager – Plant Chemistry / Environmental is responsible for day-to-day environmental monitoring.

The Auditing Organization Chart (Fig. 5.1-1) lists the groups utilized in reviewing and auditing of the Susquehanna SES environmental programs as well as those responsible for managing these programs.

An audit of compliance with the EPP program was conducted during 2016 as part of a regularly scheduled Chemistry Program Audit. There were no findings or noncompliances identified as a result of this effort. The program was determined to be effective and well implemented.

### **5.2 Records Retention**

Records and logs relative to environmental aspects of plant operation and audit activities are retained in the Nuclear Records System. This system provides for review and inspection of environmental documents, which are available to the NRC upon request.

All records concerning modifications of plant structures, systems, and components which are determined to potentially affect the continued protection of the environment are retained for the life of the plant. All other records, data, and logs relating to the environmental programs and monitoring are retained for at least five years or, where applicable, in accordance with the requirements of other agencies. Transmission line corridor vegetation maintenance records are maintained by PPL Electrical Utilities per section 2.2.3 of this report.

### 5.3 Changes in Environmental Protection Plan

No changes were made to the EPP during 2017.

### 5.4 Plant Reporting Requirements

#### 5.4.1 Routine Reports

This Annual Environmental Operating Report (Nonradiological) was prepared to meet routine reporting requirements of the EPP for 2017. It provides summaries and analyses of environmental protection activities required in Subsection 4.2 of the EPP for the reporting period.

#### 5.4.2 Non-routine Reports

There were no Unusual or Important Environmental Events as defined by the Environmental Protection Plan that required reporting in 2017.

## **6.0 ATTACHMENTS**

### Table 2.1-1

America Shad Impingement Monitoring (2017)

### Figure 5.1-1

Auditing Organization Chart (2017)

**TABLE 2.1-1**

**SUSQUEHANNA STEAM ELECTRIC STATION  
2017 AMERICAN SHAD IMPINGEMENT PROGRAM  
1 August – 29 September 2017**

<b>Date</b>	<b>Time</b>	<b>Items Found on Trash Bar/Traveling Screen</b>				
<b>2017</b>		<b>Shad</b>	<b>Fish</b>	<b>Crayfish</b>	<b>Other</b>	<b>Comments</b>
01 Aug	0813	Fish baskets were installed.				
02 Aug	1230	0	4 bluegill 3 green sunfish 1 spotfin shiner	02 Aug	1230	0
03 Aug	1530	0	0	03 Aug	1530	0
04 Aug	1300	0	1 pumpkin seed 1 channel catfish	04 Aug	1300	0
07 Aug	1430	0	4 green sunfish 1 spotfin shiner 1 margined madtom 1 channel catfish	07 Aug	1430	0
08 Aug	1500	0	1 green sunfish 1 pumpkin seed 1 spotfin shiner	08 Aug	1500	0
09 Aug	1500	0	1 channel catfish 1 bluegill	09 Aug	1500	0
10 Aug	1500	0	1 smallmouth bass 1 redbreast sunfish 1 channel catfish	10 Aug	1500	0
11 Aug	1500	0	1 channel catfish 1 redbreast sunfish	11 Aug	1500	0
14 Aug	1500	0	2 green sunfish 1 bluegill 1 quillback	14 Aug	1500	0
15 Aug	1530	0	1 rock bass 1 margined madtom 1 channel catfish	15 Aug	1530	0
16 Aug	1500	0	1 channel catfish	16 Aug	1500	0
17 Aug	1500	0	0	17 Aug	1500	0
18 Aug	1300	0	1 bluegill 1 green sunfish 1 walleye	18 Aug	1300	0

**TABLE 2.1-1 (cont.)**

<b>Date</b>	<b>Time</b>	<b>Items Found on Trash Bar/Traveling Screen</b>				
<b>2017</b>		<b>Shad</b>	<b>Fish</b>	<b>Crayfish</b>	<b>Other</b>	<b>Comments</b>
21 Aug	1300	0	1 channel catfish 1 smallmouth bass 1 quillback	1	0	Moderate leaves/debris
22 Aug	1700	0	2 channel catfish 1 smallmouth bass	0	0	Heavy leaves/debris
23 Aug	1400	0	1 margined madtom	0	0	Moderate leaves/debris
24 Aug	1500	0	1 channel catfish 1 spotfin shiner 1 smallmouth bass 1 margined madtom	2	0	Heavy leaves/debris
25 Aug	1700	0	1 smallmouth bass 1 channel catfish 1 common carp	0	0	Light leaves/debris
28 Aug	1500	0	4 smallmouth bass 2 channel catfish 1 bluegill 1 redbreast sunfish	1	0	Moderate leaves/debris
29 Aug	1500	0	2 smallmouth bass 1 channel catfish 1 bluegill	1	0	Light leaves/debris
30 Aug	1430	0	1 smallmouth bass 1 channel catfish	0	0	Light leaves/debris
31 Aug	1600	0	1 margined madtom	0	0	Light leaves/debris
01 Sep	1300	0	1 channel catfish 1 margined madtom 1 brown bullhead	5	0	Light leaves/debris
05 Sep	1500	0	1 spotfin shiner	0	0	Moderate leaves/debris
06 Sep	1230	0	1 channel catfish 1 yellow bullhead	1	0	Light leaves/debris
07 Sep	1400	0	0	0	0	Moderate leaves/debris
08 Sep	1600	0	1 channel catfish	0	0	Moderate leaves/debris
11 Sep	1530	0	1 green sunfish	0	0	Moderate leaves/debris
12 Sep	1500	0	1 spotfin shiner	0	0	Light leaves/debris
13 Sep	1500	0	1 spotfin shiner 1 channel catfish	1	0	Light leaves/debris

**TABLE 2.1-1 (cont.)**

<b>Date</b>	<b>Time</b>	<b>Items Found on Trash Bar/Traveling Screen</b>				
<b>2017</b>		<b>Shad</b>	<b>Fish</b>	<b>Crayfish</b>	<b>Other</b>	<b>Comments</b>
14 Sep	1600	0	1 smallmouth bass 1 spotfin shiner	0	0	Light leaves/debris
15 Sep	1500	0	1 channel catfish 1 smallmouth bass	0	0	Moderate leaves/debris
18 Sep	1400	0	1 rockbass	1	1 live common snapping turtle	Heavy leaves/debris
19 Sep	1530	0	1 rockbass 1 smallmouth bass	1	0	Heavy leaves/debris
20 Sep	1730	0	0	0	0	Heavy leaves/debris
21 Sep	1500	0	0	0	0	Heavy leaves/debris
22 Sep	1600	0	0	0	0	Heavy leaves/debris- Baskets pulled due to amount of leaves/debris over weekend span.
25 Sep	1600	0	0	0	0	- Redeployed @0800 Moderate leaves/debris
26 Sep	1600	0	1 pumpkinseed	0	0	Moderate leaves/debris
27 Sep	1530	0	0	0	0	Moderate leaves/debris -Low river level the past 1-2 weeks.
28 Sep	1330	0	0	0	0	Moderate leaves/debris

**TABLE 2.1-1 (cont.)**

Date	Time	Items Found on Trash Bar/Traveling Screen				
2017		Shad	Fish	Crayfish	Other	Comments
29 Sep	1500	0	0	0	0	Very Heavy leaves/debris -Baskets pulled @1700
<b>TOTALS</b>		<b>0</b>	<b>86 fish - 14 species</b>	<b>38*</b>	<b>4</b>	
			21 channel catfish 15 smallmouth bass 12 green sunfish 9 bluegill 8 spotfin shiner 6 margined madtom 3 pumpkinseed 3 redbreast sunfish 3 rock bass 2 quillback 1 brown bullhead 1 common carp 1 walleye 1 yellow bullhead		1 live American bullfrog  2 dobsonflies  1 live common snapping turtle	

\*All crayfish collected were *Orconectes obscurus*.

# FIGURE 5.1-1 AUDITING ORGANIZATION CHART (2017)

