

# **Annex B**

## **SUPPLEMENTAL INFORMATION**

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**Table: Common wetland plant species in Curwensville Lake (SRBC, 2012).**

Common Name	Scientific Name
Woolgrass	<i>Scirpus cyperinus</i>
Rice cut grass	<i>Leersia oryzoides</i>
Cattail	<i>Typha</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Blue flag iris	<i>Iris</i>
Silky dogwood	<i>Cornus amomum</i>
Arrowwood	<i>Viburnum</i>
Smooth alder	<i>Alnus serrulata</i>
Black willow	<i>Salix nigra</i>
Red maple	<i>Acer rubrum</i>
Silver maple	<i>Acer saccharinum</i>

**Table: Fish species collected in Curwensville Lake.** Sampling conducted from 1998 – 2009 (a,b,c). Compiled by SRBC (2012).

Scientific Name	Common Name
<i>Notemigonus crysoleucas</i>	Golden shiner
<i>Cyprinus carpio</i>	Common carp
<i>Luxilus cornutus</i>	Common shiner
<i>Pimephales notatus</i>	Bluntnose minnow
<i>Semotilus atromaculatus</i>	Creek chub
<i>Notropis hudsonius</i>	Spottail shiner
<i>Moxostoma macrolepidotum</i>	Shorthead redhorse
<i>Catostomus commersonii</i>	White sucker
<i>Ameiurus natalis</i>	Yellow bullhead
<i>Ameiurus nebulosus</i>	Brown bullhead
<i>Esox niger</i>	Chain pickerel
<i>Esox masquinongy x lucius</i>	Tiger muskellunge
<i>Ambloplites rupestris</i>	Rock bass
<i>Micropterus salmoides</i>	Largemouth bass
<i>Lepomis macrochirus</i>	Bluegill
<i>Lepomis gibbosus</i>	Pumpkinseed
<i>Micropterus dolomieu</i>	Smallmouth bass
<i>Pomoxis annularis</i>	White crappie
<i>Pomoxis nigromaculatus</i>	Black crappie
<i>Lepomis cyanellus</i>	Green sunfish
<i>Perca flavescens</i>	Yellow perch
<i>Sander vitreus</i>	Walleye
<i>Etheostoma olmstedii</i>	Tessellated darter

<sup>(a)</sup> (Hollender & Kristine, 1999), <sup>(b)</sup> (Pennsylvania DEP, 2009), <sup>(c)</sup> (PFBC, 2009)

Hollender, B., & Kristine, D. (1999). *Curwensville Lake (308B) Management Report*. Pennsylvania Fish and Boat Commission, Bureau of Fisheries, Division of Fisheries Management.

Pennsylvania DEP. (2009, March 5). Fisheries survey of Curwensville Reservoir, File #18668.

Pennsylvania Fish and Boat Commission. (2009, May). Biologists Reports: Curwensville Lake, Clearfield County

**Table: Scientific Names of Select Aquatic Plants and Animals of Susquehanna River (TNC, 2010).**

Common Name	Scientific Name
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Plants

Eurasian watermilfoil	<i>(Myriophyllum spicatum)</i>
Riverweed	<i>(Podostemum ceratophyllum)</i>
Common waterweed	<i>(Elodea canadensis)</i>
European naiad	<i>(Najas minor)</i>
Slender Naiad	<i>(Najas gracilliana)</i>
Southern naiad	<i>(Najas guadalupensis)</i>
Water willow	<i>(Justicia americana)</i>
Lizard's tail	<i>(Sarurus cernuus)</i>

Benthic Macroinvertebrates

Eastern floater	<i>(Pyganodon cataracta)</i>
Zebra mussel	<i>(Dreissena polymorpha)</i>

Finfish

Black crappie	<i>(Pomoxis nigromaculatus)</i>
Smallmouth bass	<i>(Micropterus dolomieu)</i>
Largemouth bass	<i>(Micropterus salmoides)</i>
Muskellunge	<i>(Esox masquinongy)</i>
Tiger muskellunge	<i>(Esox masquinongy x lucius)</i>
Sunfish	<i>(Lepomis spp.)</i>
Yellow perch	<i>(Perca flavescens)</i>
Brown bullhead	<i>(Ameiurus nebulosus)</i>
Yellow bullhead	<i>(Ameiurus natalis)</i>
Common carp	<i>(Cyprinus carpio)</i>
Alewife	<i>(Alosa pseudoharengus)</i>

Rare Species

Yellow lamp-mussel	<i>Lampsilis cariosa</i>
Green floater	<i>Lasmigona subviridis</i>
Brook floater	<i>Alasmidonta varicosa</i>
Hellbender	<i>Cryptobranchus alleganiensis</i>

**Table: Alternative plans' percentage of future years with drawdowns by one foot intervals<sup>1</sup>.**

Drawdown Level (ft)	Drawdown Elevation Range (ft)		Alternative*			
	Upper	Lower	Baseline	R95	H95	M95
1 < Drawdown ≤ 2	1161	1160	8	12	10	12
2 < Drawdown ≤ 3	1160	1159	0	4	4	4
3 < Drawdown ≤ 4	1159	1158	0	1	0	0
4 < Drawdown ≤ 5	1158	1157	4	4	3	3
5 < Drawdown ≤ 6	1157	1156	0	1	1	1
6 < Drawdown ≤ 7	1156	1155	0	0	0	1
7 < Drawdown ≤ 8	1155	1154	0	0	1	0
8 < Drawdown ≤ 9	1154	1153	0	4	0	0
9 < Drawdown ≤ 10	1153	1152	3	3	3	3
10 < Drawdown	1152	1151	0	0	0	0
Total			13	28	22	23

\*The data presented in this table differ somewhat from that presented in Table 2-9 because of rounding errors.

<sup>1</sup> Modified from Table 5-1 from SRBC Curwensville (2012): "Table 5-1 Simulated Number of Years (Percentage of Years) Maximum Drawdown Occurs within Selected Drawdown Intervals for the Entire Modeling Period."

**Monthly P95 Values Presented in this EA versus Some Earlier SRBC and USACE Documents**

While preparing this EA, it was identified that monthly P95 values presented in the text of several previous SRBC and USACE reports differ from the P95 trigger values used in the OASIS model. Documents pertaining to Curwensville Lake with this discrepancy are included in Table 1 below:

**Table 1: Earlier documents with P95 discrepancies.**

Preliminary Assessment of Optimizing Use of Commission-Owned Water Storage at Cowanesque and Curwensville Lakes, Pennsylvania (USACE and SRBC, November 2010)
Addendum to Main Report, Preliminary Assessment of Optimizing Use of Commission-Owned Water Storage at Cowanesque and Curwensville Lakes, Pennsylvania (USACE and SRBC, March 2011)
Optimizing Use of Commission-Owned Water Storage at Curwensville Lake, Pennsylvania (EA Engineering, Science, and Technology, May 2012)
Draft Environmental Assessment, Curwensville Lake Water Supply Releases to West Branch Susquehanna and Susquehanna Rivers, Pennsylvania (USACE, March 2016)
Letter Report, Proposed Change to Water Supply Release Plan, Curwensville Lake, Pennsylvania (USACE, January 2016)

SRBC and USACE investigated this discrepancy. The monthly P95 values were calculated based on gage record start date through to 2007. These values were used to model water supply releases and lake drawdowns, including associated environmental and recreational impacts. SRBC file review revealed that erroneous P95 values presented in the documents in Table 1 linked back to early project model runs which included an additional 120 cfs (adjustment) to trigger flows for gages downstream of the Juniata River to account for existing low flow augmentation at Raystown Lake. Subsequently, because Raystown Lake low flow augmentation had been part of the low flow record for downstream gages for over four decades, it was decided that the 120 cfs trigger flow adjustment was not necessary. The H95 and M95 alternatives included in OASIS modeling efforts were based on actual P95 values, not P95 + 120 cfs values. However, the adjusted P95 values were erroneously included in the reports identified above. Table 2 presents correct P95 and erroneous P95 values for the H95 and M95 alternatives:

**Table 2: Correct and Erroneous P95 Values**

Month	H95 Alternative		M95 Alternative	
	Correct P95 Values (cfs)	Erroneous P95 Values (cfs)	Correct P95 Values (cfs)	Erroneous P95 Values (cfs)
July	3500*	3620*	3750*	3870*
August	3500	3620	3750	3870

September	2980	3100	2980	3100
October	3120	3240	3630	3750
November	3120*	3240*	3630*	3750*

\*July and November values are modified P95 monthly values of August and October P95, respectively rather than the actual correct P95 values for those months.

In summary, the OASIS modeling forming the basis of impacts assessment for Curwensville Lake in this EA used the correct P95 trigger values, and modeled impacts to Curwensville Lake (drawdown frequency, depth, duration, & timing) are valid. However, incorrect P95 trigger values were reported in earlier documents, and that error was repeated through subsequent documents.