BellBendCOLPEm Resource

From: Imboden, Stacey
Sent: Friday, August 07, 2009 11:00 AM
To: BellBendCOL Resource
Subject: FW: Initial ER RAI responses for BBNPP
Attachments: BNP-2009-195.pdf

From: Sgarro, Rocco R [mailto:rrsgarro@pplweb.com]
Sent: Friday, August 07, 2009 10:48 AM
To: Imboden, Stacey
Cc: Lutchenkov, Dimitri; Perdomo, Federico R; Beecher, Kimberly A
Subject: Initial ER RAI responses for BBNPP

Stacey,

Per our discussion this morning, here is a copy of our first set of responses. Pls advise if you have questions.

Thanks!

<<BNP-2009-195.pdf>>

Rocky

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Subject: FW: Initial ER RAI responses for BBNPP
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From: Imboden, Stacey

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"BellBendCOL Resource" <BellBendCOL.Resource@nrc.gov>
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August 5, 2009

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

BELL BEND NUCLEAR POWER PLANT RESPONSE TO ENVIRONMENTAL REQUESTS FOR ADDITIONAL INFORMATION, FIRST SUBMITTAL
BNP-2009-195 Docket No. 52-039

References: 1) Letter from U.S. NRC Document Control Desk to R.R. Sgarro (PPL), "Requests for Additional Information Related to the Environmental Review for the Combined License Application for Bell Bend Nuclear Power Plant," dated July 10, 2009

The purpose of this letter is to respond to several Environmental Report (ER) requests for additional information (RAIs) identified in the referenced NRC correspondence to PPL Bell Bend, LLC. These RAIs address environmental issues, as discussed in Part 3 and Part 11 of the Bell Bend Nuclear Power Plant Combined License Application (COLA).

Enclosure 1 provides the current ER RAI response status and the planned submittal dates for the remaining responses. PPL plans on transmitting a series of responses to the RAIs on or before the planned submittal dates provided in Enclosure 1. This approach is necessary due to the allocation of personnel resources to the response effort. The planned submittal schedule is subject to change as PPL collects/develops the information required for the responses. PPL will keep the NRC staff informed of schedule changes during our weekly status updates in addition to updates in our subsequent submittals. Enclosure 2 provides responses to 17 RAIs. Several RAIs include revised COLA content. A Licensing Basis Document Change Request has been initiated to incorporate these changes in a future revision of the COLA. This future revision of the COLA is the only new regulatory commitment contained in this submittal.

If you have any questions, please contact the undersigned at 570-802-8102.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 5, 2009

Respectfully,

Rocco R. Sgarro

Rocco R. Sgarro

RRS/kw

Enclosures: 1) Response Status for Environmental Requests for Additional Information, Bell Bend Nuclear Power Plant, Luzerne County Pennsylvania

2) Responses to Environmental Requests for Additional Information, Bell Bend Nuclear Power Plant, Luzerne County Pennsylvania

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Enclosure 1

Response Status for Environmental Requests for Additional Information
Bell Bend Nuclear Power Plant,
Luzerne County Pennsylvania

NRC Response Status for Environmental Requests for Additional Information		
RAI	**Review Plan Section**	**Planned Submittal Schedule**
ACC 7.1-1	ESRP 7.1 10	August 10, 2009
ACC 7.1-2	ESRP 7.1	Included in Enclosure 2
ACC 7.2-1	ESRP 7.2	August 10, 2009
ACC 7.2-2	ESRP 7.2	August 10, 2009
ACC 7.2-3	ESRP 7.2	August 10, 2009
ACC 7.2-4	ESRP 7.2	August 10, 2009
ACC 7.2-5	ESRP 7.2	August 10, 2009
ACC 7.2-6	ESRP 7.2	August 10, 2009
ACC 7.3-1	ESRP 7.3	September 15, 2009[1]
ACC 7.3-2	ESRP 7.3	August 10, 2009
ACC 7.3-3	N/A	August 10, 2009
ACC 7.3-4	N/A	September 15, 2009[1]
ACC 7.3-5	N/A	August 10, 2009
MET 2.7-1	ESRP 2.7	September 15, 2009[1]
MET 2.7-2	ESRP 2.7	September 15, 2009[1]
MET 2.7-3	ESRP 2.7	September 15, 2009[1]
MET 2.7-4	ESRP 2.7	September 15, 2009[1]
MET 5.3-1	ESRP 2.7, ESRP 5.3.3.1	August 10, 2009
MET 5.3-2	ESRP 2.7, ESRP 5.3.3.1	August 10, 2009
MET 5.3-3	ESRP 5.3.3.1	August 10, 2009
MET 5.3-4	ESRP 5.3.3.1	August 10, 2009
MET 5.3-5	ESRP 5.3.3.1	August 10, 2009
MET 6.4-1	ESRP 2.7, ESRP 6.4	September 15, 2009[1]
MET 6.4-2	ESRP 6.4	September 15, 2009[1]
ALT 9.3-1	ESRP 9.3	September 15, 2009[1]
ALT 9.3-2	ESRP 9.3	September 15, 2009[1]
ALT 9.3-3	ESRP 9.3	September 15, 2009[1]
ALT 9.3-4	ESRP 9.3	September 15, 2009[1]
ALT 9.3-5	ESRP 9.3	September 15, 2009[1]
AE 2.3-1	ESRP 2.3.1	September 15, 2009[1]
AE 2.3-2	ESRP 2.3.1	Included in Enclosure 2
AE 2.3-3	ESRP 2.3.1	September 15, 2009[1]
AE 2.4-1	ESRP 2.4.2	Included in Enclosure 2
AE 2.4-2	ESRP 2.4.2	Included in Enclosure 2
AE 2.4-3	ESRP 2.4.2	Included in Enclosure 2
AE 2.4-4	ESRP 2.4.2	Included in Enclosure 2
AE 2.4-5	ESRP 2.4.2	Included in Enclosure 2
AE 3.4-1	ESRP 3.4.2	August 10, 2009
AE 3.4-2	ESRP 3.4.2	August 10, 2009
AE 3.4-3	ESRP 3.4.2	August 10, 2009
AE 3.4-4	ESRP 3.4.2	August 10, 2009
AE 4.3-1	ESRP 4.3.2	Included in Enclosure 2
AE 4.3-2	ESRP 4.3.2	September 15, 2009[1]
AE 4.3-3	ESRP 4.3.2	August 10, 2009
AE 4.3-4	ESRP 4.3.2	August 10, 2009
AE 5.3-1	ESRP 5.3.1.2	August 10, 2009
AE 5.3-2	ESRP 5.3.1.2	Included in Enclosure 2
AE 9.3-1	ESRP 9.3	September 15, 2009[1]
AE 9.3-2	ESRP 9.3	August 10, 2009
AE 9.3-3	ESRP 9.3	August 10, 2009
AE 9.3-4	ESRP 9.3	September 15, 2009[1]
CR 2.5-1	ESRP 4.1.3, ESRP 5.1.3	August 10, 2009
CR 2.5-2	ESRP 4.1.3	August 10, 2009
CR 2.5-3	ESRP 4.1.3, ESRP 5.1.3	August 10, 2009

NRC Response Status for Environmental Requests for Additional Information (continued)		
RAI	**Review Plan Section**	**Planned Submittal Schedule**
CR 2.5-4	ESRP 4.1.3, ESRP 5.1.3	August 10, 2009
CR 2.5-5	ESRP 2.5.2, ESRP 2.5.3	August 10, 2009
CR 2.5-6	ESRP 2.5.2, ESRP 2.5.3	September 15, 2009[1]
CR 2.5-7	ESRP 4.1.3, ESRP 5.1.3	September 15, 2009[1]
CR 2.5-8	ESRP 4.1.3, ESRP 5.1.3	September 15, 2009[1]
STO 1-1	N/A	September 15, 2009[1]
STO 2.1-1	ESRP 2.2, 2.4, 2.5, and 4.3	September 15, 2009[1]
STO 2.1-2	ESRP 2.1	September 15, 2009[1]
STO 2.2-1	ESRP 2.2	September 15, 2009[1]
STO 2.3-1	ESRP 2.3	September 15, 2009[1]
GEO 2.6-1	ESRP 2.6 10	September 15, 2009[1]
H 2.3-1	ESRP 2.3-2	September 15, 2009[1]
H 2.3-2	ESRP 2.3-2	September 15, 2009[1]
H 3.4-1	ESRP 3.4.1	August 10, 2009
H 3.6-1	ESRP 3.6.1	August 10, 2009
H 3.6-2	ESRP 3.6.1	Included in Enclosure 2
H 4.2-1	ESRP 4.2.1	August 10, 2009
H 5.2-1	ESRP 5.2.2	September 15, 2009[1]
H 5.3-1	ESRP 5.3.2.1	September 15, 2009[1]
H 6.3-1	ESRP 6.3	October 12, 2009[1]
H 9.3-1	ESRP 9.3	September 15, 2009[1]
H 9.4-1	ESRP 9.4.2	September 15, 2009[1]
H 9.4-2	ESRP 9.4.2	August 10, 2009
H 9.4-3	ESRP 9.4.2	August 10, 2009
LU 2.2-1	ESRP 2.2.1	Included in Enclosure 2
LU 3.7-1	ESRP 4.1	September 15, 2009[1]
LU 4.1-1	ESRP 4.1	September 15, 2009[1]
LU 5.1-1	ESRP 4.1	September 15, 2009[1]
LU 5.1-2	ESRP 4.1	September 15, 2009[1]
NRHH 10.5-1	N/A	August 10, 2009
RHH 4.5-1	ESRP 4.5, ESRP 5.4-2	August 10, 2009
RHH 4.5-2	ESRP 4.5	September 15, 2009[1]
RHH 4.5-3	ESRP 4.5	September 15, 2009[1]
RHH 5.4-1	ESRP 5.4-2	August 10, 2009
SE 2.5-1	ESRP 2.5.1	Included in Enclosure 2
SE 2.5-2	ESRP 2.5.1	September 25, 2009[1]
SE 2.5-3	ESRP 2.5.2	September 25, 2009[1]
SE 2.5-4	ESRP 2.5.2	September 15, 2009[1]
SE 2.5-5	ESRP 2.5.2	August 10, 2009
SE 2.5-6	ESRP 2.5.2	Included in Enclosure 2
SE 2.5-7	ESRP 2.5.2	September 15, 2009[1]
SE 2.5-8	ESRP 2.5.2	September 15, 2009[1]
SE 2.5-9	ESRP 2.5.2	August 10, 2009
SE 2.5-10	ESRP 2.5.4	September 15, 2009[1]
SE 2.5-11	ESRP 2.5.4	August 10, 2009
SE 2.5-12	ESRP 2.5.4	August 10, 2009
SE 2.5-13	ESRP 2.5.4	September 15, 2009[1]
SE 4.4-1	ESRP 4.4.1	September 15, 2009[1]
SE 4.4-2	ESRP 4.4.1	August 10, 2009
SE 4.4-3	ESRP 4.4.2	September 25, 2009[1]
SE 4.4-4	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-5	ESRP 4.4.2	Included in Enclosure 2
SE 4.4-6	ESRP 4.4.2	August 10, 2009

NRC Response Status for Environmental Requests for Additional Information (continued)		
RAI	**Review Plan Section**	**Planned Submittal Schedule**
SE 4.4-7	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-8	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-9	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-10	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-11	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-12	ESRP 4.4.2	September 25, 2009[1]
SE 4.4-13	ESRP 4.4.2	September 15, 2009[1]
SE 4.4-14	ESRP 4.4.3	September 15, 2009[1]
SE 5.8-1	ESRP 5.8.2	September 15, 2009[1]
SE 5.8-2	ESRP 5.8.2	Included in Enclosure 2
CB 10.4-1	ESRP 10.4.2	September 15, 2009[1]
TE 2.4-1	ESRP 2.2.1	August 10, 2009
TE 2.4-2	ESRP 2.2.1	Included in Enclosure 2
TE 2.4-3	ESRP 2.4.1	September 15, 2009[1]
TE 2.4-4	ESRP 2.4.1	August 10, 2009
TE 2.4-5	ESRP 2.4.1	Included in Enclosure 2
TE 2.4-6	ESRP 2.4.1	September 15, 2009[1]
TE 2.4-7	ESRP 2.4.1	September 15, 2009[1]
TE 2.4-8	ESRP 2.4.1	September 15, 2009[1]
TE 4.3-1	ESRP 4.3.1	September 15, 2009[1]
TE 4.3-2	ESRP 4.3.1	September 15, 2009[1]
TE 4.3-3	ESRP 4.3.1	September 15, 2009[1]
TE 4.3-4	ESRP 4.3.1	September 15, 2009[1]
TE 4.3-5	ESRP 4.3.1	August 10, 2009
TE 4.3-6	ESRP 4.3.1	August 10, 2009
TE 4.3-7	ESRP 4.3.1, ESRP 9.3	September 15, 2009[1]
TE 4.3-8	ESRP 4.3.1	September 15, 2009[1]
TE 4.3-9	ESRP 4.3.1	September 15, 2009[1]
TE 4.3-10	ESRP 4.3.1	September 15, 2009[1]
TR 4.7-1	ESRP 4.7	September 15, 2009[1]
TR 4.7-2	ESRP 4.7	August 10, 2009

USACE Response Status for Environmental Requests for Additional Information	
RAI	**Planned Submittal Schedule**
USACE-1	October 16, 2009[1]
USACE-1a	September 15, 2009[1]
USACE-1b	October 16, 2009[1]
USACE-2	October 16, 2009[1]
USACE-2a	October 16, 2009[1]
USACE-2b	October 16, 2009[1]
USACE-2c	October 16, 2009[1]
USACE-2d	October 16, 2009[1]
USACE-2e	October 16, 2009[1]
USACE-2f	October 16, 2009[1]
USACE-2g	September 15, 2009[1]
USACE-2h	October 16, 2009[1]
USACE-3	October 16, 2009[1]

[1]The responses to these RAIs were requested to be provided within 30 calendar days. Based on vendor review and input, the time required to complete the necessary work will exceed this timeframe and PPL requests additional time, as indicated above.

Enclosure 2

Responses to Environmental Requests for Additional Information,
Bell Bend Nuclear Power Plant,
Luzerne County Pennsylvania

RAI ACC 7.1-2

ESRP 7.1

Summary: *Provide a justification of notes a) and b) in Table 7.1-4 in ER.*

Full Text: Notes a) and b) in Table 7.1-4 in ER are identical. Are they intended to convey different concepts? If so, explain.

Response: Note b) in Table 7.1-4 has been corrected to the following to convey a different concept:

b. Core inventories are bounding for U-235 fuel enrichment ranging between two and five percent and burnups up to 62,000 MWd/MTU.

COLA Impact:
BBNPP COLA ER, Table 7.1-4, Note (b) will be updated as follows, in a future COLA revision:

Table 7.1-4 U.S. EPR Bounding Core Inventory
Notes (a)(b)(c)
(Page 3 of 3)

Radionuclide	Inventory Ci (Bq)
Key: Ci – curies Bq – Becquerels Notes: a. This table lists the design basis source term inventories for radiological consequences for the U.S. EPR core. b. ~~This table lists the design basis source term inventories for radiological consequences for the U.S. EPR core.~~Core inventories are bounding for U-235 fuel enrichment ranging between two and five percent and burnups up to 62,000 MWd/MTU. c. The design basis power level is 4,612 MWt.	

RAI AE 2.3-2

ESRP 2.3.1

Summary: *Provide a description of the ecological resources associated with the North Branch Pennsylvania Canal.*

Full Text: The ER variously refers to a canal as the North Branch Canal, North Branch Pennsylvania Canal, and North Canal. The proposed construction and operation of the BBNPP could affect the ecological resources in this canal.

Response: The North Branch Canal, North Branch Pennsylvania Canal, and North Canal all refer to the North Branch Division of the Susquehanna Canal System, which is a part of the Pennsylvania Canal System (PCS, 2009)[1]. The north branch of the canal was constructed along the Susquehanna River from Northumberland north to the state lines of Pennsylvania and New York (ACS, 2009)[2]. This is a single canal that runs parallel to the Susquehanna River at the southeastern corner of the Owner Controlled Area (OCA).

The canal is steep-sided and trough-like with limited water movement through the section within the OCA. It is similar to other canals in Pennsylvania in that it supports a lentic warmwater aquatic community. Thick submerged aquatic vegetative growth was present throughout the canal during a site visit in July of 2008. From visual inspection, it was evident that limited structure was available within the canal that would serve as fish habitat. The fish community in the Canal is similar to that of Lake Took-a-While, which is hydrologically connected to the Canal. Based on the fish community present within Lake Took-a-While the fish species likely present within the Canal are typical of Pennsylvania warmwater lentic waterbodies and are described in BBNPP ER Section 2.4.2.1.3.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

[1] PCS 2009. Website: http://www.pacanalsociety.org/sites.htm Date accessed: April 14, 2009.
[2] ACS 2009. Website: Canal Links, Information Sheet, Pennsylvania. http://www.americancanals.org/Pennsylvania/North%20Branch%20Div.pdf Date accessed: April 14, 2009.

RAI AE 2.4-1

ESRP 2.4-2

Summary: *Provide information about any aquatic disease vectors or pests, such as black flies or Flavobacterium, but excluding the nuisance species described, that may occur on the site or in the Susquehanna River near the site.*

Full Text: None

Response: There are no known fish diseases that can be transmitted to humans for the fish species that occur onsite or in the Susquehanna River. There are, however, common fish diseases that occur naturally in populations, but none were documented during fish studies within the Susquehanna River or onsite waterbodies. A recent outbreak of Flavobacterium columnare (columnaris), a common soil and water bacteria, has occurred in the Susquehanna River drainage during the past few years (PFBC, 2009a). The organism has primarily affected young-of-year smallmouth bass in the Susquehanna River. The disease is considered a secondary infection brought on by environmental or nutritional factors that stress fish, which leads to a weakened immune system and reduced capacity to fight-off infection. The bacterium is not a concern for human health but the Pennsylvania Fish and Boat Commission (PFBC) has advised that anglers not eat infected fish. In 2008 diseased smallmouth bass were collected by PFBC in the upper sections of the North Branch Susquehanna River upstream of the proposed BBNPP site (PFBC, 2009b[3]). Also in 2008, the PFBC collected diseased smallmouth bass downstream of the BBNPP site in the vicinity of the confluence of West Branch and North Branch Susquehanna River.

Aquatic disease vectors or pests potentially occurring in onsite waterbodies or in the Susquehanna River include black flies and mosquitoes. Most species of black flies in Pennsylvania do not transmit pathogens, parasites, or diseases to humans. Mosquitoes are known to transmit the West Nile Virus, which is discussed in Section 2.4.1.4 of the BBNPP ER.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

[3] PFBC, 2009b. Susquehanna River smallmouth management, Public Meeting January 2009. http://www.fish.state.pa.us/pafish/bass_black/workshop/smb2009/usgs_crawford.pdf Date accessed: April 10, 2009.

RAI AE 2.4.2

ESRP 2.4-2

Summary: *Provide information about the occurrence of the quagga mussel (Dreissena bugenis) in the Susquehanna River.*

Full Text: None

Response: The quagga mussel (Dreissena bugensis) is an aquatic nuisance species that was introduced to the United States from Europe and Asia. This species, similar to zebra mussel, was originally introduced into the United States within the Great Lakes region. In the future this species could potentially be introduced into the Susquehanna River. The quagga mussel currently has not been found in the Susquehanna River drainage and has a limited distribution in Pennsylvania (PSG, 2009)[4].

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

[4] PSG 2009. Pennsylvania zebra mussel and quagga mussel monitoring network: Distribution maps, Website: http://seagrant.psu.edu/zm/ Date accessed: April 8, 2009.

RAI AE 2.4-3

ESRP 2.4-2

Summary: *Provide more detailed information about existing natural and anthropogenic stresses, such as acid mine drainage, Marcellus Shale gas extraction, urban development, invasive species, and climate change, on the onsite streams and ponds and the Susquehanna River Basin.*

Full Text: The ER sections mention some for the stresses but the staff need additional detail for evaluation.

Response:

Walker Run

Natural and anthropogenic stressors to Walker Run are similar to many of those that impact similar-sized streams within the eastern portion of Pennsylvania. Many of these occurred in the past but the legacy of these activities still shapes the streams and rivers of Pennsylvania. Within the Walker Run basin the combination of timber harvest and mill dam construction altered many aspects of the watershed. Timber harvest led to increased rates of erosion and transport of sediment into Walker Run. Mill dam construction led to changes in stream flow characteristics as well as accumulations of sediment behind the dams. Current and historic agricultural practices in the Walker Run watershed altered the landscape and changed the function of the Walker Run riparian area. These activities include the removal of native riparian vegetation, which decreases channel shading and reduces inputs of large woody debris into the stream. Planting row crops close to the stream channel reduces buffering capacity (i.e., nutrient uptake of overland flow) and exposes soil to erosion, and causes a general loss of riparian function. Channelization of Walker Run along Market Street decreased channel sinuosity and in turn reduced available habitat for aquatic biota. Additionally, the fish community has been altered from its natural state, historically most likely a brook trout (*Salvelinus fontinalis*) fishery now replaced by introduced brown trout (*Salmo trutta*).

In its present state the Walker Run watershed is predominantly forested with the major land use in the basin being agriculture, which is mostly restricted to the lower portion of the watershed. Agricultural activities are known stressors to aquatic ecosystems. Urban development and associated impervious surfaces are a small percentage of the overall land cover within the watershed. However, even small amounts of impervious areas are known to cause changes to aquatic ecosystems. Impervious surfaces in the watershed that may act as stressors include residential homes, driveways, and roads.

Acid mine drainage and Marcellus Shale gas extraction are not existing stressors to the Walker Run watershed, based on observations made during numerous field visits to the watershed as part of ecological studies.

Ponds

The onsite ponds are man-made impoundments; thus, a natural state or condition does not apply to these waterbodies. Nonetheless, the major stressor to the ponds is sedimentation from runoff, which may lead to accumulation of sediments in the ponds and loss of benthic habitat. Natural stressors to the shallow onsite ponds that impact aquatic organisms are low dissolved oxygen concentrations that occur during the summer and winter months.

Susquehanna River

The aforementioned anthropogenic stressors that affect Walker Run are also applicable to the Susquehanna River basin. In addition, there are other stressors that impact the Susquehanna River. Historic coal mining in much of the upper portion of the watershed (Lackawanna River watershed) led to degraded water quality; associated water quality problems from acid mine drainage (AMD) include low pH, elevated levels of iron, armoring of bottom substrate, deposition of fine sediments which fill interstitial spaces, turbidity, and heavy metals (SRBC, 2008[5] and PPL, 2006[6]). Prior to the Clean Water Act, wastewater discharges were a major stressor that degraded water quality in the River. Consumptive water withdrawals from the basin also can be a stressor to the River ecosystem, especially during critical low flow periods when minimum flows must be maintained in order to provide adequate habitat for aquatic biota.

The extraction of natural gas from the Marcellus Shale Formation could be a future stressor to the Susquehanna River basin. The Marcellus Shale Formation occurs in 72 percent of the Susquehanna River basin. The extraction procedure requires large volumes of water for the drilling process. The amount of water used for this process varies depending on the type of well and can range from one to five million gallons per well (PADEP, 2009[7]). An additional component of this process is the wastewater by-product that is produced during drilling; this wastewater needs to be properly treated after completion of drilling to minimize environmental impacts. Ninety-nine gas pad locations have been approved by rule by the Susquehanna River Basin Commission (SRBC, 2009[8]). The pad locations are within the West Branch Susquehanna River Subbasin and the Middle Susquehanna River Subbasin (MSRB). Those in the MSRB are within the North Branch Susquehanna River watershed; however, they are located upstream of BBNPP in Bradford and Susquehanna Counties.

Invasive species are a concern to the aquatic systems in Pennsylvania. Much of the current fish community in the Susquehanna River is comprised of established non-native species. Many of these are considered important recreational species even though they are non-native introductions. Non-native species that were collected in the Susquehanna River include common carp, channel catfish, northern pike, muskellunge, green sunfish, smallmouth bass, brown trout, and walleye. Recently established or potential future invader species are a concern and could become a stressor to the River system. These include the Asiatic clam (*Corbicula fluminea*), zebra mussel (*Dreissena polymorpha*), rusty crayfish (*Orconectes rusticus*), and flathead catfish (*Pylodictis olivaris*).

No specific studies of climate change were utilized in development of the ER sections pertinent to effects on the onsite streams and ponds or the Susquehanna River at the BBNPP.

COLA Impact:

No changes to the BBNPP COLA ER are required as a result of this RAI response.

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5 SRBC, 2008. Susquehanna River Basin Commission, Comprehensive Plan for the Water Resources of the Susquehanna River Basin, December 2008.

6 PPL, 2006. PPL Susquehanna, LLC, Supplemental Environmental Report, Extended Power Uprate, Susquehanna Steam Electric Station, PPL Susquehanna, LLC, Unit 1, Docket No. 50-387, License No. NPF-014; Unit 2, Docket No. 50-388, License No. NPF-022, March 2006.

7 PADEP, 2009. Pennsylvania Department of Environmental Protection, 2009. Marcellus Shale Information. Website: http://www.dep.state.pa.us/dep/deputate/minres/oilgas/new_forms/marcellus/marcellus.htm. Date Accessed: July 15, 2009.

8 SRBC, 2009. Susquehanna River Basin Commission, 2009. Marcellus Shale. Website: http://www.srbc.net/programs/projreviewmarcellus.htm. Date Accessed: July 15, 2009.

RAI AE 2.4-4

ESRP 2.4-2

Summary: *Provide a list of the fish species identified from the Susquehanna River samples included in ER Tables 2.4-16 to 2.4-19. Include the genus and species names for each identified species.*

Full Text: The common names were used; please include the scientific names.

Response: A list of species identified from the Susquehanna River samples included in ER Tables 2.4-16 to 2.4-19 is provided in the table following this response.

COLA Impact:
BBNPP COLA ER Section 2.4.2.2.2, 4th paragraph, will be updated, and a new table will be added to the BBNPP COLA ER (Table 2.4-33 titled "List of Fish Species Collected with Seine or Electrofishing Boat in the Susquehanna River at SSES and Bell Bend, 2004 to 2007") as follows, in a future COLA revision.

2.4.2.2.2 Fish Community

A total of 20 species and 1,034 individual fish were collected by seining at the SSES (upstream) station from 2004 to 2007 (Table 2.4-16). A majority of the species collected were from three families: Cyprinidae (minnow family), Centrarchidae, and Percidae (perch family). Two cyprinids were numerically dominant, spotfin and spottail shiner, comprising 40.4% and 23.5% of the catch, respectively. Other abundant taxa included white sucker (13.3%) and bluntnose minnow (7.7%). Year-to-year variation was evident in both numbers of individuals and number of species collected. Greater numbers of individuals (434) and species of fish (14) were collected during 2007 than any other year. At Bell Bend (downstream) a total of 19 species and 3,664 individuals were collected by seining from 2004 to 2007 (Table 2.4-17). Similar to the SSES station, most of the collected species were from three families: Cyprinidae, Centrarchidae, and Percidae. The dominant taxa numerically were spotfin shiner (49.8%) and spottail shiner (26.1%); white sucker (14.3%) and bluntnose minnow (5.4%) were abundant. Year-to-year variation was more pronounced than at the upstream station with significantly fewer individuals and species collected during 2006 than the other years as a result of fewer sampling events during 2006.

Twenty-one fish species and 1,921 individuals were collected by electrofishing at SSES from 2004 to 2007 (Table 2.4-18). Centrarchidae made up a large portion of the total catch and seven species from this family were collected. The dominant taxa were smallmouth bass (21.6%), walleye (16.1%), quillback (11.8%), northern hog sucker (11.0%), shorthead redhorse (8.3%), and rock bass (8.1%). Fewer species and numbers of fish were collected during 2006 than the other years as a result of fewer sampling events in 2006. At Bell Bend, 1,971 individuals representing 23 fish species were collected by electrofishing from 2004 to 2007 (Table 2.4-19).

Similar to the SSES station, Centrarchidae was the dominant fish family with seven species being collected. Smallmouth bass was the dominant taxon representing 30.2% of the total catch. Other abundant species included walleye (19.3%), quillback (12.6%), and rock bass (8.2%). Inter-annual variation was evident with fewer species and individuals

collected during 2006 than the other sample years coincident with fewer sampling events during 2006.

Similar fish assemblages were present upstream and downstream of the proposed intake/discharge structures, although fewer fish were collected at the upstream seining station in comparison to the downstream station. Seasonal fish abundance and distribution was also similar between the stations. The fish assemblage in this reach of River is similar to other sections of the River, both upstream and downstream. Additionally, the fish community is similar to other large rivers in Pennsylvania (NAI, 1996). A list of fish species collected during seining and electrofishing from 2004 through 2007 is provided in Table 2.4-33.

Table 2.4-33 List of Fish Species Collected with Seine or Electrofishing Boat in the Susquehanna River at SSES and Bell Bend, 2004 to 2007

Common name	Scientific name
Rock bass	*Ambloplites rupestris*
Yellow bullhead	*Ameirus natalis*
Brown bullhead	*Ameirus nebulosus*
Quillback	*Carpiodes cyprinus*
Sucker spp.	*Catostomidae spp.*
White sucker	*Catostomus commersonii*
Spotfin shiner	*Cyprinella spiloptera*
Common carp	*Cyprinus carpio*
Gizzard shad	*Dorosoma cepedianum*
Northern pike	*Esox lucius*
Muskellunge	*Esox masquinongy*
Chain pickerel	*Esox niger*
Pike spp.	*Esox spp.*
Tessellated darter	*Etheostoma olmstedi*
Banded darter	*Etheostoma zonale*
Northern hog sucker	*Hypentelium nigricans*
Channel catfish	*Ictalurus punctatus*
Redbreast sunfish	*Lepomis auritus*
Green sunfish	*Lepomis cyanellus*
Pumpkinseed	*Lepomis gibbosus*
Bluegill	*Lepomis macrochirus*
Sunfish spp.	*Lepomis spp.*
Smallmouth bass	*Micropterus dolomieu*
Shorthead redhorse	*Moxostoma macrolepidotum*
River chub	*Nocomis micropogon*
Comely shiner	*Notropis amoenus*
Spottail shiner	*Notropis hudsonius*
Yellow perch	*Perca flavescens*
Bluntnose minnow	*Pimephales notatus*
White crappie	*Pomoxis annularis*
Black crappie	*Pomoxis nigromaculatus*
Blacknose dace	*Rhinichthys atratulus*
Brown trout	*Salmo trutta*
Walleye	*Sander vitreus*
Fallfish	*Semotilus corporalis*

RAI AE 2.4-5

ESRP 2.4-2

Summary: *Provide a statement about the importance of recreational fishing in the BBNPP area (e.g. 6-mile area), including any of the recreational species in the Susquehanna River or North Branch Canal that are regulated by the State.*

Full Text: Recreational fishing was briefly described in the ER. Please indicate its importance.

Response: Recreational fishing is not a critical component of the local economy in the vicinity of BBNPP. However, the area near BBNPP does provide recreational fishing opportunities for anglers. This area is not more important to anglers than other sections of the River. In the North Branch Susquehanna River, upstream from the confluence of the North and West Branches of the Susquehanna River, the three most popular recreational fish species are smallmouth bass, walleye, and channel catfish. Section 2.4.2.2.3 of the BBNPP COLA ER identifies the recreationally important fish present in the Susquehanna River in the vicinity of BBNPP. For the North Branch Canal recreationally sought after species are described in Section 2.4.2.1.3 of the BBNPP COLA ER.

The fish species that occur in inland waters of Pennsylvania, including the aforementioned recreational species in the Susquehanna River and North Branch Canal, are regulated by the Pennsylvania Fish and Boat Commission.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

RAI AE 4.3-1

ESRP 4.3-2

Summary: *Provide information about the potential for colonization of retention and stormwater basins by aquatic fauna, particularly nuisance species.*

Full Text: The proposed new unit will include a large retention basin to collect water before discharge into the Susquehanna River. Stormwater basins would be used to help control runoff. Please discuss the potential colonization of these waterbodies.

Response: The potential does exist for the retention/stormwater basins to be colonized by aquatic flora and fauna. Aquatic flora and fauna could be transferred to the basins by waterfowl and other means. The following information describes why this potential does not pose a concern.

As noted in BBNPP ER Section 2.4.2.2.8, the Asiatic clam (Corbicula fluminea) is the only known nuisance species to presently occur in the Susquehanna River in the vicinity of the BBNPP site. However, as also noted in BBNPP ER Section 2.4.2.2.8, it is probable that the down-river migration of zebra mussels will continue and that sometime in the near future they will be present in the river near BBNPP. However, the colonization of the basins by Asiatic clam (*Corbicula fluminea)* or zebra mussel (*Dreissena polymorpha*) is highly unlikely given that both species would not be able to survive in the environmental conditions that would exist in a typical stormwater basin. Asiatic clams typically live in lotic habitats and would not survive in a temporary environment that would exist in the basins. Likewise, zebra mussels would not persist in this type of basin. Zebra mussels need to attach to hard substrates in order to live. Hard substrates would not be prevalent in the basins. The basins could be dry for extended periods during certain times of the year, which would also reduce the likelihood that nuisance aquatic species could persist in them. Both of the aforementioned species could not tolerate potentially low dissolved oxygen levels that could occur in the basins. In addition, both species feed on suspended particles of algae and organic detritus, these food items would be present in limited quantities within the basins.

Colonization of the basins by invasive wetland plants such as purple loosestrife and common reed is possible. Both species are present within the BBNPP owner controlled area (OCA); however, these and other invasive wetland plants can be kept under control using standard vegetation management practices.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

RAI AE 5.3-2

ESRP 5.3.1.2

Summary: *Provide estimates of survival for organisms impinged or entrained by the cooling water system (intake/discharge) and the potential for, and impacts of, recirculating heated effluent.*

Full Text: Provide estimates of survival for organisms passing through the cooling system and the potential impacts of recirculating heated effluent.

Response: Organisms impinged and entrained at the BBNPP Circulating Water System (CWS) intake will not survive. The design of the BBNPP CWS will employ a closed-cycle cooling system that results in complete mortality of entrained organisms (PP&L, 1978[9]). Complete mortality of impinged organisms will also occur because the BBNPP CWS travelling screens do not employ a fish return system; impinged fish will be washed from the travelling screens and deposited into trash receptacles. The design of the existing Susquehanna Steam Electric Station (SSES) CWS intake is similar to that described for the BBNPP CWS (PPL, 2005[10]).

The heated effluents from both the SSES or BBNPP discharges are not expected to recirculate and thus no impacts are likely to occur. This expectation is based upon the spatial arrangement (distance between the intake and discharge structures) of the SSES and BBNPP CWS intake and discharge structures, coupled with their locations on the river. The BBNPP CWS intake structure will be located approximately 300 feet downstream of the SSES CWS intake structure and the discharge structures will be approximately 300 feet (SSES) and approximately 720 feet (BBNPP) downstream of the BBNPP CWS intake. The location of the cooling water systems on a free-flowing, non-tidal, portion of the Susquehanna River, with elevation change from intake to discharge, also minimizes the potential for recirculation of the heated discharge back to the intake. Even if the heated discharge was able to recirculate back to the BBNPP intake, there would be no adverse impact since the impinged and entrained organisms normally will experience complete mortality.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

[9] PP&L, 1978. Susquehanna Steam Electric Station Environmental Report, Operating License Stage, May 1978.
[10] PPL, 2005. PPL Susquehanna, LLC, EPA 316(b) Phase II Documentation, NPDES Renewal Application, January 2005.

RAI H 3.6-2

ESRP 3.6.1

Summary: *Provide "Table A5.5: Anticipated water chemical concentrations in Susquehanna River downstream of BBNPP discharge" from calculation AREVA 32-9084971-001. This calculation was reviewed during the site audit.*

Full Text: This calculation was titled, "EIR Calc Sheet Water Parameters for BBNPP." The response should include information on the procedures to be used to ensure all effluents will be treated, controlled and discharged at concentrations low enough to meet State and EPA effluent limitation guidelines and water-related aspects for new source performance standards.

Response: A copy of Table A5.5-1: Anticipated Water Chemical Concentrations in Susquehanna River Downstream of BBNPP Discharge" (same as ER Table 5.5-1) is attached. This table was developed from calculation AREVA 32-9084971-001, which included Susquehanna River water quality data, anticipated chemical treatment information, and the anticipated cycles of concentration in the cooling towers, to calculate the estimated concentration of constituents in the wastewater effluent from BBNPP. A subsequent calculation, AREVA 32-9088328-000, then used water quality values for the wastewater effluent, the effluent discharge rate and the Susquehanna River water flow rate (under low-flow conditions), to calculate the estimated concentration of constituents in the Susquehanna River downstream of the effluent discharge diffusers (at a completely mixed condition).

The following describes how plant effluents will be treated, controlled and discharged at concentrations low enough to meet State and U.S. EPA effluent limitation guidelines:

Cooling Tower Blowdown
As discussed in ER Section 3.6.3.2, the largest source of water-related effluent at BBNPP will be blowdown from the Circulating Water System (CWS) and the Essential Service Water System (ESWS) cooling towers. As shown on ER Table 3.3-1, the anticipated average cooling tower blowdown discharge rate is 8,497 gallons per minute, which is approximately 98 percent of the anticipated effluent discharge to the Susquehanna River.

Dissolved solid constituents that are present in the cooling tower intake water (from the Susquehanna River) will increase in concentration within the cooling towers due to evaporation. Limited amounts of treatment chemicals will be added to the intake, piping, and cooling towers to control biofouling, microbial growth, scale formation, sedimentation and/or corrosion and to adjust pH. Planned treatment chemicals include sodium hypochlorite solution (an oxidizing biocide), sulfuric acid (to adjust pH), and deposit control agents. Approval of the use of these chemicals will be obtained through the NPDES permitting process.

The blowdown from the CWS and ESWS cooling towers will be directed into the Wastewater Retention Basin where it is combined with other wastewaters including the Raw Water Supply System (RWSS) backwash, demineralizer feed filter reject and miscellaneous water flows. The Wastewater Retention Basin has been designed with sufficient retention time and proper dimensions to allow settling of solids in the combined wastewater. Treatment of the blowdown with sodium bisulfite in order to control residual chlorine concentration in the wastewater effluent and comply with US EPA New Source Performance Standards is anticipated.

The treated wastewater will be discharged to the Susquehanna River through a discharge diffuser, under an NPDES permit. The discharge will meet NPDES permit limits. Tables 3.6-6 and 3.6-7 of the ER present the anticipated concentration of constituents in the cooling tower blowdown streams based on three cycles of concentration and the anticipated chemical treatment.

Concentrations of constituents in the effluent discharge stream will be significantly diluted by river water. Even at low-flow river conditions, the BBNPP discharge flow will be only approximately 1.5% of the river flow. ER Table 5.5-1 shows the estimated constituent concentrations in the river downstream of the diffuser after complete mixing.

Liquid Radioactive Wastes
As discussed in ER Section 3.5.2.1, liquid radioactive wastes will be generated in the nuclear island vent and drain system, the decontamination system, the coolant treatment system and the laundry. These wastes will be collected in the Liquid Waste Storage System where the wastes will be segregated into storage tanks based on radioactivity and chemical properties. Three classifications of wastes based on radioactivity (Group I, Group II and Group III) have been developed. Group I wastes are highly radioactive and can include wastes such as water from the fuel pool, sump water, liquid wastes from decontamination, and wastewaters generated in the Liquid Waste Treatment System. Group II wastes are low radioactivity to inactive liquid wastes and can include wastes such as sump water from operating rooms, waste water from showers and washrooms, and distillate from the reactor coolant treatment system. Group III wastes are inactive liquid wastes and can include wastes such as flushing water from mechanical filter of the steam generator blowdown demineralizing system, and drain water from supply air device. The radioactive waste waters will be pre-treated in the Liquid Waste Storage System using chemical and biological treatment to adjust pH and reduce organics in the waste.

Liquid radioactive wastes from the three Groups will be forwarded to the Liquid Waste Processing System where treatment by evaporation, centrifugation, demineralization/filtration, chemical precipitation and/or organic decomposition will occur. Following treatment, the wastes will be forwarded to monitoring tanks in the Liquid Waste Storage System. The activity in the treated wastes will be monitored prior to discharge. Discharge of treated liquid radioactive wastewaters will occur intermittently. The maximum discharge rate for these wastes is estimated at 11 gallons per minute on a continuous basis. Treated waste waters will be discharged downstream of the Wastewater Retention Basin.

Stormwater
As discussed in ER Section 3.6.3.2, site stormwater will be collected through networks of storm sewers and drainage ditches and drained to stormwater ponds. The stormwater ponds are designed to retain the runoff up to and including a 100-year, 24-hour rainfall. The storm drainage system is designed to carry the peak storm runoff from a 50-year rainfall without flooding the adjacent plant roads and facilities. Two stormwater ponds are planned.

Best Management Practices will be developed as part of a Stormwater Pollution Prevention Plan (SWPPP) to control potential impacts to surface water from site operations. Practices including the proper storage and management of hazardous materials, inspections for leaks, effective spill prevention and response, personnel training will be utilized to prevent significant impacts to surface water.

Sanitary Wastewater
As discussed in ER Section 3.6.2, sanitary wastewater will not be treated and discharged on-site, but will be collected and directed into the municipal sewer system. The requirements of the sewer-use permit will be met.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

Table A5.5-1: Anticipated Water Chemical Concentrations in the Susquehanna River Downstream of BBNPP Discharge

Parameter	Units	Estimated Maximum Concentration In BBNPP Discharge	Estimated Mean Concentration In BBNPP Discharge	Estimated Maximum Concentration In River Downstream	Estimated Mean Concentration In River Downstream
Total Alkalinity	mg/l	180	78	95.3	61.3
Total Suspended Solids	mg/l	447	87	87.6	17.2
Silica (Silicon Dioxide)	mg/l	14	8	4.9	2.9
Bicarbonate as $CaCO_3$	mg/l	279	187	97	66
Chloride	mg/l	121	83	41	27
Fluoride	mg/l	0.3	0.3	0.1	0.1
Nitrate as NO_3	mg/l	10	6	3.5	2.2
Nitrate as N	mg/l	2	1	0.8	0.5
Phosphorus as PO_4	mg/l	2	1	0.7	0.2
Sulfate	mg/l	253	186	54	29
Aluminum, Total	ug/l	8,123	1,359	2,783	453
Barium, Total	ug/l	172	97	56.8	33.0
Calcium, Total	mg/l	114	78	40	27
Iron, Total	mg/l	17	4	5.8	1.3
Magnesium, Total	mg/l	30	18	10.9	6.5
Manganese, Total	ug/l	762	331	239.1	131.0
Potassium, Total	mg/l	7	5	2.4	1.6
Sodium, Total	mg/l	74	43	24.9	15.6
Strontium, Total	ug/l	495	299	181.9	105.0
Zinc, Total	ug/l	77	45	24.8	15.6
Arsenic, Total	ug/l	9	3	2.9	0.8
Lead, Total	ug/l	15	15	5.2	5.1
Total Dissolved Solids	mg/l	713	553	209	149
Calcium Hardness	mg/l	285	195	99	68
Total Hardness	mg/l	388	270	136	95
HEDP	mg/l	5	5	0	0
Dispersant	mg/l	5	5	0	0

Notes: Downstream river concentrations were calculated using 2006 and 2007 Susquehanna River water quality data, a river flow rate for August low-flow conditions and estimated plant discharge flows.

mg/l – milligrams per liter
ug/l – micrograms per liter
TDS – total dissolved solids

RAI LU 2.2-1

ESRP 2.2.1

Summary: *Provide a revised table that revalidates data in Table 2.2-6.*

Full Text: The applicant stated that they would revalidate information in Table 2.2-6 to assure that product yields/production information in the region is correctly presented.

Response: The information in Table 2.2-6 was verified. Typographical errors were found in the table under column headings, "Total Farmland Acres" and "Land Value" for Bradford County. These values will be corrected. Additionally, typographical errors were found under the table column heading, "Total Farmland Acres" for Berks County.

COLA Impact:
The following change to Section 2.2 will be incorporated into a future revision of the BBNPP COLA ER:

ER Table 2.2-6 will be revised to correct the total farmland acres for Bradford and Berks counties and the land value for Bradford County. ER Table 2.2-6 will be updated as follows, in a future COLA revision:

Table 2.2-6: Land Use Categories within 50 mi (80 km) Region

County	Total Farmland Acres (Hectares)	Land Value (Dollars per acre)	Grains	Tobacco	Vegetables, Melons, Potatoes	Fruits, Nuts, Berries	Nursery, Greenhouse, Sod	Hay	Poultry, Eggs	Cattle	Dairy Products, Cows	Equine	Aquaculture
			Values listed in 1000's of dollars										
Bradford	~~30,2475 (122,407)~~ 302,475 (122,407)	~~$1,980~~ $1,790	$1,175		$752		$1,534	$3,204		$27,097	$54,922	$87	
Berks	~~21,5679 (87,282)~~ 215,679 (87,282)	$5,527	$10,203		$2,312	$4,436	$96,809	$4,924	$70,845	$18,252	$59,970	$477	$244
Carbon	19,257 (7,793)	$4,436	$238				$3,698	$497	$22	$344	$505	$71	$61
Columbia	123,514 (49,984)	$3,137	$4,739		$3,524		$6,415	$1,219	$2,499	$1,929	$8,832	$105	$82
Dauphin	94,983 (38,438)	$5,291	$4,493	$29	$1,217	$843	$1,197	$2,007	$14,248	$5,957	$15,100	$209	$69
Lackawanna	32,931 (13,327)	$3,205			$3,832	$668	$3,262	$618			$3,110	$477	
Lebanon	125,066 (50,612)	$5,349	$7,081	$150	$3,950	$713	$4,138	$963	$68,446	$18,499	$58,294	$184	$1,053
Lehigh	91,304 (36,949)	$4,504	$8,332			$2,510	$21,386	$1,944		$1,066	$3,267	$553	
Luzerne	73,216 (29,629)	$3,541	$1,364		$7,822	$1,714	$6,136	$767	$33	$921	$3,100	$109	
Lycoming	177,347 (71,770)	$2,318	$4,664	$37	$1,291	$1,957	$4,602	$2,410	$4,660	$8,664	$14,990	$176	$64
Monroe	32,938 (13,320)	$5,191	$882		$641	$242	$2,348	$454	$17	$324	$360	$67	$1,014
Montour	39,964 (16,172)	$2,996		$80	$226	$253		$448	$1,604	$1,721	$4,332		
Northampton	77,556 (31,386)	$4,862	$6,866		$1,522	$840	$2,486	$1,419	$84	$1,034	$6,041	$42	
Northumberland	119,129 (48,210)	$3,099	$10,004	$416	$4,644	$1,356	$9,040	$969	$20,744	$31,886	$11,485	$88	
Pike	10,113 (4,093)	$2,878			$15		$992	$38		$29	$432		
Schuylkill	110,946 (44,898)	$3,383	$3,976		$5,716	$1,026	$16,717	$1,624	$21,535	$3,045	$7,206	$127	$1,922
Snyder	100,034 (40,482)	$3,558	$2,452	$51	$2,205	$1,191	$402	$832	$30,734	$10,913	$18,855	$117	
Sullivan	31,096 (12,584)	$1,878	$48				$249	$291	$1	$1,105	$5,152	$59	$5
Susquehanna	189,287 (76,601)	$2,162	$130		$152	$309	$407	$1,390		$13,426	$26,093	$106	
Union	69,424 (28,095)	$4,156	$3,148				$642	$968	$15,350	$5,920	$21,701		
Wayne	113,167 (45,797)	$2,111	$42		$215	$370	$753	$979	$51	$2,296	$15,667	$117	
Wyoming	61,846 (25,028)	$2,276	$307		$530	$203	$780	$743	$3	$1,123	$7,592		

Note:

Values are for top agricultural commodities listed for each county. All commodity sales for 2002 Census are not listed.

RAI SE 2.5-1

ESRP 4.1.3

ESRP 5.1.3

Summary: *Address the apparent inconsistencies between data for mean household vs. mean individual income levels in ER Section 2.5.1.1.2 and other parts of the ER.*

Full Text: ER Section 2.5.1.1.2 presents data for mean household income levels in Columbia and Luzerne Counties. In Chapter 4 of the ER, the mean income level presented for individuals is identified at levels that exceed the household values supplied in this section. Since mean individual income levels could not possibly exceed the mean household income levels for the same population, this apparent inconsistency should be addressed. Income data impact calculations relating to tax revenue and other economic impacts of the BBNPP.

Response: The U.S. census provides the following guidance when using median income measures and provides the basis for use of median household income:

"The distribution of wealth in the United States has a large positive skew, with relatively few households holding a large proportion of the wealth. For this type of distribution, the median is the preferred measure of central tendency because it is less sensitive than the average (mean) to extreme observations. The median is also considerably lower than the average, and provides a more accurate representation of the wealth and asset holdings of the typical household." http://www.census.gov/prod/2003pubs/p70-88.pdf
An explanation of the specific uses of these terms is shown below:

ER Section 2.5.1 describes demographic and economic characteristics for areas surrounding BBNPP. Central tendency measures in ER Section 2.5.1.1.2 are median household income and not mean household income. As an example, "Columbia County had the higher median income in the ROA: $37,871 in 2004 versus Luzerne County's median income of $36,968." Table 2.5-4 includes these values.

ER Section 2.5.2 reports mean and median household income in Table 2.5-14. Text in ER Section 2.5.2.3.1 describes median values for household income: "...the 2000 median household income in Luzerne County was $33,771, somewhat lower than the Scranton—Wilkes-Barre—Hazleton MSA ($34,161) and significantly lower than the state of Pennsylvania ($40,106) and the U.S. ($41,994) median household income. The 2006 median household income in Luzerne County was $39,687, significantly lower than the $46,259 median household income for the state of Pennsylvania and the $48,451 for the U.S."

Text in ER Section 2.5.2.3.2 also describes median values for household income: "...the 2000 median household income in Columbia County was $34,094, significantly lower than the state of Pennsylvania ($40,106) and the U.S. ($41,994) median household income and about equal with the Scranton—Wilkes-Barre—Hazleton MSA ($34,161). The 2006 median household income in Columbia County was $39,135, lower than the $46,259 for the state of Pennsylvania and the $48,451 for the U.S."

Mean income levels for individuals are reported in Chapter 4 of the ER. Section 4.4.2.5.2 reports mean earnings: "The average annual salary for the direct workforce would be significantly more than the $52,370 mean earnings in Luzerne County in 2006 and the $48,437 mean earnings

in Columbia County." ER Section 4.4.3.1.1 mentions county level mean earnings : "...compared to the mean earnings of $64,352 in Pennsylvania in 2006." ER Section 4.4.3.1.2 also mentions county level mean earnings "...compared to the mean earnings of $52,370 in Luzerne County and $48,437 in Columbia County in 2006."

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

RAI SE 2.5-6

ESRP 2.5.2

Summary: *Discuss the status of the housing stock in the vicinity of the project since the 2000 Census, including other substantial development projects and expansions.*

Full Text: Discuss whether recent changes in the housing stock in the project vicinity could affect the distribution and impact of the construction and operations workforce.

Response: The most recent housing data available from the US Census Bureau, the 2005-2007 estimate, was used to assess the changes to the housing stock in Luzerne and Columbia Counties compared to that provided in the ER, specifically 2000 and 2006 data (ER Table 2.5-16). The US Census Bureau only provides estimates of data in the non-census years. Average annual percent changes between the 2005-2007 estimate data and the 2000 data can be found in the table below. Few changes, when compared to the original 2000-2006 analysis, have occurred. One slight difference is that in Columbia County, the percentage of renter occupied housing units has changed slightly. It increased over the 7 year period (0.7%) yet decreased over the 6 year period (-2.8%) in Columbia County. In addition, the percent increase over the seven-year period in total unoccupied units was slightly lower than during the 2000-2006 period. The analysis suggests that the trends in the housing stocks (with the exception of the Columbia County renter trend) remained the same, with the majority of changes occurring within a fraction of a percent. From the point of view of capacity, the number of unoccupied units continues to increase.

As discussed in ER Section 10.5, there are currently two known projects within the ROI that may compete for resources or otherwise increase demands on public services. These include a new 42 in (106.7 cm) natural gas pipeline (Transcontinental Leidy to Long Island Gas Pipeline) in Luzerne County, PA, and the Susquehanna-Roseland electrical transmission line. Only a small portion of these projects would actually occur within the ROI and both projects should be completed and operational prior to construction of the BBNPP facility. No other future facility projects are anticipated on the SSES and BBNPP sites that may be affected. As a result, it is unlikely that changes in housing stock in the project vicinity would affect the distribution and impact of the construction and operations workforce.

ER Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

Average Annual % Changes Between 2005-2007 Estimate Data and 2000 Data

Housing Units	County/Location					
	Luzerne County		Columbia County		Total ROI	
	Number	Percent	Number	Percent	Number	Percent
2005-2007 Estimate						
Total Housing:	147,318	100%	28,771	100%	176,089	100%
Total Occupied Units:	129,840	88.1%	25,589	88.9%	155,429	88.3%
Owner-Occupied	92,019	70.9%	18,366	71.8%	110,385	62.7%
Renter-Occupied	37,821	29.1%	7,223	28.2%	45,044	26.0%
Total Unoccupied Units:	17,478	11.9%	3,182	11.1%	20,660	11.7%
Year-around Units	n/a	n/a	n/a	n/a	n/a	n/a
Seasonal, recreational, or occasional use units	n/a	n/a	n/a	n/a	n/a	n/a
2000-2007 Average Annual Percent Change						
Total Housing:	0.3%		0.5%		0.3%	
Total Occupied Units:	-0.1%		0.4%		0%	
Owner-Occupied	0%		0.3%		0.1%	
Renter-Occupied	-0.4%		0.7%		-0.2%	
Total Unoccupied Units:	2.8%		1.6%		2.7%	
Year-around Units	n/a		n/a		n/a	
Seasonal, recreational, or occasional use units	n/a		n/a		n/a	

RAI SE 4.4-5

ESRP 4.4.2

Summary: *In identifying the number of indirect workers as well as income and tax revenue tied to each indirect worker, assume that 100 percent of these indirect workers are already located within the ROI. That is, provide an analysis that assumes that none of the indirect workers would be in-migrants.*

Full Text: Service industry jobs tied to the indirect employment opportunities will most likely be nearly if not entirely filled by the local population.

Response: In ER Section 4.4.2, it was estimated that a maximum of 954 indirect jobs would be created within the ROI under the 20% scenario and 1,670 indirect workforce jobs would be created under the 35% scenario (multiplying 3,440 ROI peak direct workers by the BEA indirect employment/economic multiplier of 1.3866, BEA, 2008). A US Census Bureau multiplier was then applied to estimate the number of these indirect jobs that would be taken by an in-migrating construction worker family member. On this basis, an estimated 532 to 930 indirect jobs located within the ROI could be filled by the spouses and other family members of the direct workforce. The remainder of the indirect jobs (423 to 739) would likely be filled by existing unemployed residents (ER Tables 4.4-7 and 4.4-8).

For purposes of this analysis, PPL believes that the use of an existing US Census Bureau statistic best represented the distribution of indirect jobs created. Furthermore, assuming that 100% of the indirect workers would already be located within the ROI would not change the net benefit of income and tax revenue from the creation of the 954 to 1,670 indirect jobs. Whether the jobs are filled by in-migrating spouses or family members or existing unemployed residents within the ROI, the taxes paid per person would be approximately the same and the economic benefit essentially the same.

COLA Impact:
No changes to the BBNPP COLA ER are required as a result of this RAI response.

RAI SE 5.8-2

ESRP 5.8.2

Summary: *There is a mitigation measure identified for Route 11 and Orange Street that was apparently not discussed in the construction section. Indicate if this mitigation measure should be added to the construction section. If it is a measure specifically designed to address the operations workforce, describe the nature of the issue addressed by this proposed mitigation measure.*

Full Text: None

Response: The mitigation measure identified for the intersection of Route 11 and Orange Street was not discussed in ER Section 4.4.1. The response to RAI SE 4.4-2 will provide additional information relative to the mitigation measures being considered for each of the subject intersections including Route 11 and Orange Street. This information will be included in a revision of ER Section 4.4.1.

Mitigation at the Route 11 and Orange Street intersection is constrained due to narrow lanes, commercial establishments on either side of the center left turn lane, and the lack of shoulders. As a result, the mitigation measure proposed is signal retiming.

No change to ER Section 5.8.2 is suggested since signal timing as a mitigation measure is specifically discussed for the intersection of Route 11 and Orange Street.

COLA Impact:
No changes to the BBNPP COLA ER Section 5.8.2 are required as a result of this RAI response. Changes to BBNPP COLA ER Section 4.4.1 will be addressed by RAI SE 4.4-2.

RAI TE 2.4-2

ESRP 2.2.1

Summary: *Provide Figure 2.2-1 with a clear legend.*

Full Text : Figure 2.2-1, Land Use on the BBNPP Site: The legend is partially obscured, excluding some land use categories.

Response: ER Figure 2.2-1 will be revised to show the entire legend.

COLA Impact:
ER Figure 2.2-1 will be revised to show the entire legend and will be updated as follows in a future COLA revision:

Figure 2.2-1 Land Use on the BBNPP Site

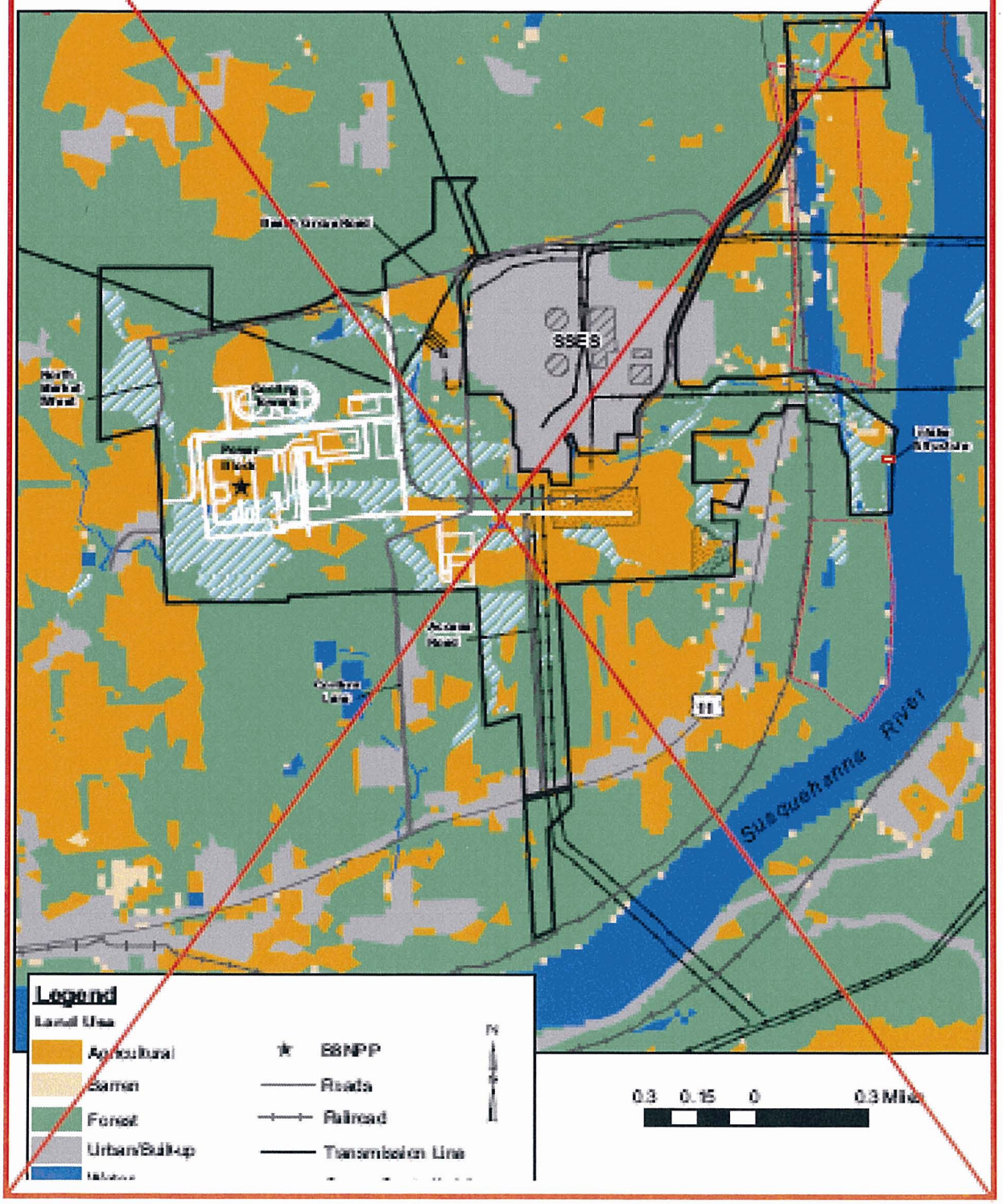
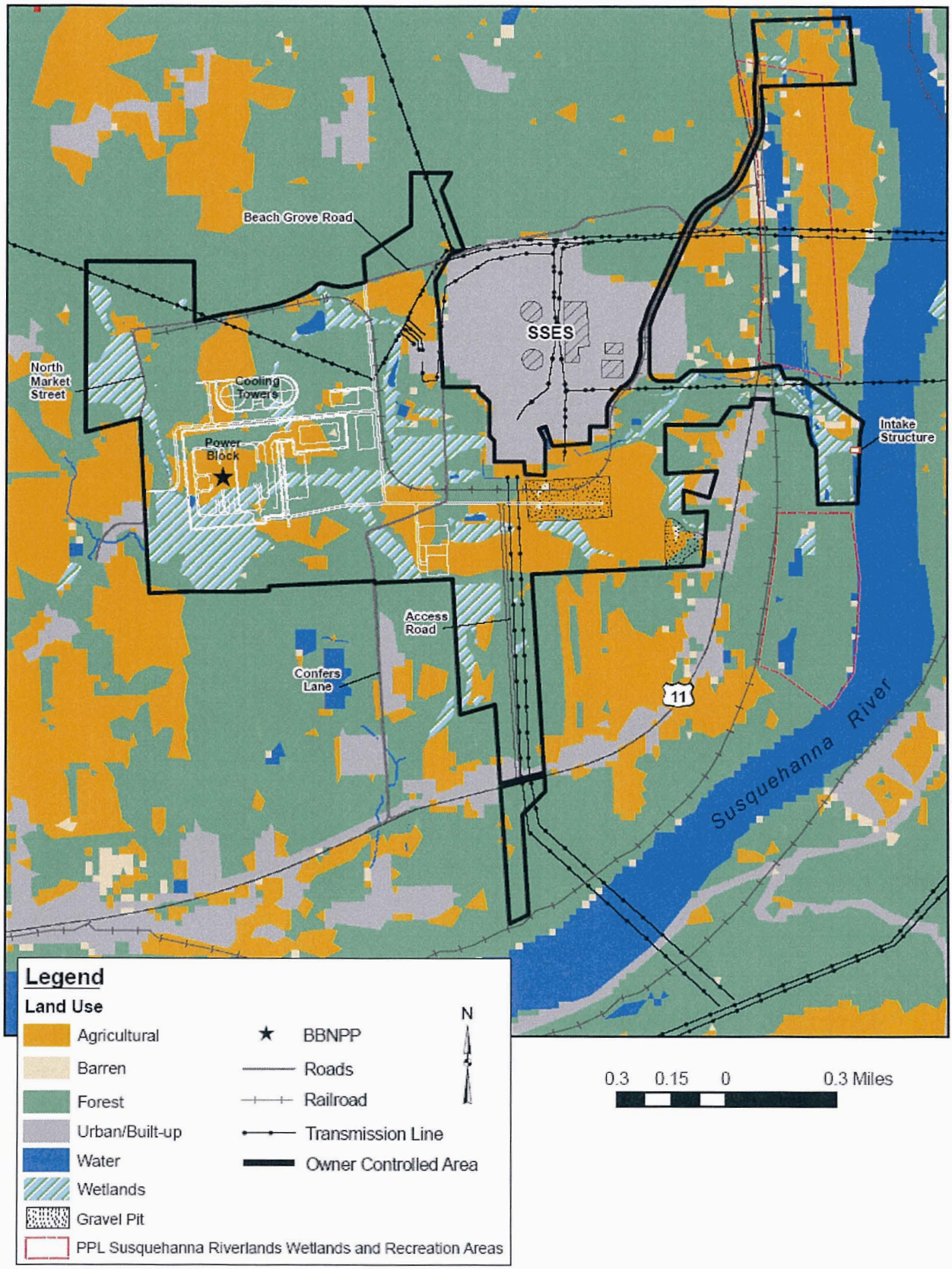


Figure 2.2-1 Land Use on the BBNPP Site



RAI TE 2.4-5

ESRP 2.4-1

Summary: Confirm the occurrence of *Solidago rigida*, stiff goldenrod, within the OCA boundary.

Full Text: The Pennsylvania Natural Heritage Program (PNHP) website for state-listed species in Luzerne County was compared with *A Field Survey of Plant Communities at the Proposed Bell Bend Nuclear Power Plant Site, Luzerne County, Pennsylvania.* A State-endangered plant species, *Solidago rigida*, stiff goldenrod, listed on the PNHP website, was recognized on the OCA in the Field Survey document but not listed as important in the ER. Please explain.

Response: Stiff goldenrod (Solidago rigida) was not observed within the BBNPP OCA. This species was erroneously listed in the Field Survey document. The species of goldenrod observed within the BBNPP OCA were Canada goldenrod (*Solidago Canadensis*), Giant goldenrod (*Solidago gigantea)*), wrinkled goldenrod (*Solidago rugosa*), and flat-top fragrant goldenrod (*Euthamia graminifolia*).

Table 1 in the Field Survey document will be revised to delete the listing for stiff goldenrod (*Solidago rigida)* within the OCA boundary.

COLA Impact:
No changes to COLA ER Section 2.4.1 are required as a result of this RAI response.

COLA Part 11J, Terrestrial Ecology, "A Field Survey of Plant Communities at the Proposed Bell Bend Nuclear Power Plant Site, Luzerne County, Pennsylvania," "Table 1. Common plants identified in the Bell Bend NPP Owner Controlled Area." will be updated as follows in a future COLA revision:

Table 1. Common plants identified in the Bell Bend NPP Owner Controlled Area.
Table 1. (Continued)

Scientific Name	Common Name
Herbs	
Mitchella repens	partridge-berry
Oenothera biennis	common evening-primrose
Osmunda cinnamomea	cinnamon fern
Oxalis spp.	wood-sorrels
Panicum dichotomiflorum	fall panic grass
Phalaris arundinacea	Reed canary grass
Phleum pretense	timothy grass
Phragmites australis	common reed
Phytolacca americana	common pokeweed
Plantago lanceolata	English plantain
Plantago major	common plantain
Pilea pumila	clearweed
Podophyllum peltatum	may-apple
Polygonum arifolium	halberd-leaf tearthumb
Polygonum cespitosum	cespitose knotweed
Polygonum perfoliatum	mile-a-minute
Polygonum sagittatum	arrow-leaved tearthumb
Polygonum virginianum	Virginia knotweed
Prunella vulgaris	heal-all
Rubus hispidus	bristly blackberry
Rudbeckia hirta	black-eyed Susan
Rudbeckia laciniata	cut-leaf coneflower
Rumex crispus	curly dock
Sagittaria latifolia	broad-leaf arrow-head
Saponaria officinalis	bouncing-bet
Schizachrium scoparium	little bluestem
Scirpus cyperinus	wool-grass
Scirpus spp.	bulrushes
Setaria faberi	Japanese bristle grass
Setaria glauca	yellow bristle grass
Solanum carolinense	Carolina nightshade
Solidago canadensis	Canada goldenrod
Solidago gigantea	giant goldenrod
~~*Solidago rigida*~~	~~stiff goldenrod~~
Solidago rugosa	wrinkled goldenrod
Sparganium spp.	burreeds
Symplocarpus foetidus	skunk-cabbage
Taraxacum officinale	common dandelion
Tridens flavus	purple-top tridens
Trifolium pretense	red clover
Typha latifolia	broad-leaved cattail
Urtica dioica	stinging nettle