PWSAP Webinar Series: Alternative Hydrogeologic Evaluation (AHE)

Part 2 - Evaluating Sustainability and Impacts to the Environment

Key Personnel

Andrew Dehoff	Executive Director
Todd Eaby	Manager, Project Review
Mike Appleby	Supervisor, Groundwater
Bill Miller	Hydrogeologist
Dave Haklar	Environmental Scientist

Webinar Series Overview

- Alternative Hydrogeologic Evaluation (AHE) Process/ Impacts to Other Users
  - January 27, 2022 - **Completed**
- Part 2 – AHE Process: Evaluating Sustainability and Impacts to the Environment
  - February 24, 2022
- Part 3 – AHE Process: Commission Developed Voluntary Action Plans and AHE Forms
  - March 24, 2022

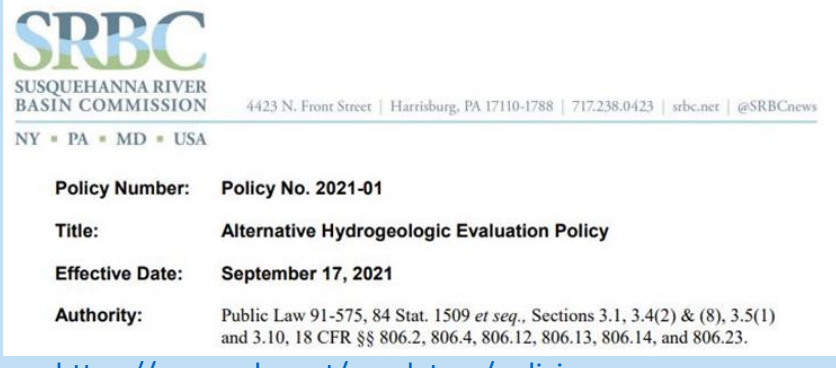
Mike Appleby

What to Expect Today

- 60 minute webinar (please mute and cameras off)
- Presentation (~45 minutes)
  - Sustainability
    - Most important to projects
  - Impacts to the environment
    - Least likely to have been previously addressed
    - Resolution may take more time than expected, so start early
    - Use screening to know what must be considered in AHE
- Bonus (stay tuned)
- Questions (~15 minutes)
  - Please utilize chat box

Mike Appleby

New AHE Policy



SRBC
SUSQUEHANNA RIVER BASIN COMMISSION
4423 N. Front Street | Harrisburg, PA 17110-1788 | 717.238.0423 | srbc.net | @SRBCnews
NY ▪ PA ▪ MD ▪ USA

Policy Number:	**Policy No. 2021-01**
Title:	**Alternative Hydrogeologic Evaluation Policy**
Effective Date:	**September 17, 2021**
Authority:	Public Law 91-575, 84 Stat. 1509 *et seq.*, Sections 3.1, 3.4(2) & (8), 3.5(1) and 3.10, 18 CFR §§ 806.2, 806.4, 806.12, 806.13, 806.14, and 806.23.

https://www.srbc.net/regulatory/policies-guidance/docs/alternative-hydrogeologic-evaluation-policy-2021-01.pdf

Mike Appleby

What Has Gone Before

- Overview
  - Focus on what matters
  - Compile and use existing data
  - Compartmentalize based on the Principal Risk Factors
  - Develop site-conceptual model
- Screening process to assess if data collection is needed
  - Series of screenings to determine if more evaluation is needed.
  - Document findings
  - Not all risk factors can be screened out
  - Complete targeted data collection
- Required when the aquifer testing requirement of 806.12 has not been met.

Mike Appleby

AHE - Sustainability

Principal Risk Factor 1: Sustainability

For the purpose of this document, the Commission considers sustainability to be the ability of a source to reliably deliver a specific quantity of water. This definition of sustainability does not consider impacts to other users or the environment, both of which are discussed separately. The Commission evaluates the sustainability of a withdrawal by assessing the ability of the source to reliably produce the requested quantity through a 1-in-10 year recurrence drought without causing unacceptable lowering of the water level in the source and the aquifer. By limiting withdrawals to not exceed the sustainability of the resource, project sponsors will operate within reliable production capabilities of their sources during dry and drought periods. Systems will also be better informed and can identify and plan for when new sources are needed to support additional growth or development without over-taxing existing sources and infrastructure. The sustainability risk factor can also account for source vulnerabilities whereby a system can plan for adaptation measures to enhance source and system resiliency in response to changing water quantity, water quality, or climate conditions.

Bill Miller

AHE - Sustainability

The Commission evaluates the sustainability of a withdrawal by assessing the ability of the source to reliably produce the requested quantity through a 1-in-10 year recurrence drought without causing unacceptable lowering of the water level in the source and the aquifer.

Bill Miller

AHE - Sustainability

- By limiting withdrawals to not exceed the sustainability of the resource, project sponsors will operate within reliable production capabilities of their sources during dry and drought periods.
- Systems will also be better informed and can identify and plan for when new sources are needed to support additional growth or development without over-taxing existing sources and infrastructure.
- The sustainability risk factor can also account for source vulnerabilities whereby a system can plan for adaptation measures to enhance source and system resiliency in response to changing water quantity, water quality, or climate conditions.

Bill Miller

AHE - Sustainability

Sustainability Criteria:

- Ability of the subject groundwater source to reliably produce the requested 30-day average (mgd) quantity for a 90-day period without recharge;
- Ability of the subject source to provide the maximum instantaneous withdrawal rate (MIWR)(gpm);
- Estimated groundwater recharge during a 1-in-10 year drought;
- Potential for loss of aquifer storage as a result of pumping (groundwater mining);
- Observed lowering of water level in the aquifer;
- Potential for excessive lowering of water levels in the well that will or can be expected to expose primary or significant water bearing zones, the top of the screened interval, pump intake, or other critical levels; and
- Potential for permanent loss of aquifer storage or damage to the aquifer, which may include, but is not limited to, compaction, biofouling, mineralization, and induced contamination.

Bill Miller

Sustainability / 30-Day Average vs. Maximum Instantaneous Withdrawal Rate (MIWR)

The Commission approves a 30-day average withdrawal rate and a MIWR. Projects have the flexibility to request higher MIWR than the corresponding 30-day average.

30-day average is not:

- Annual daily average
- Monthly daily average
- Gallons per minute limit times 1,440 (minutes in 24 hours), In general!

C44 =AVERAGE(B15:B44)

	A	B	C
1			
2		Daily Withdrawal (gpd)	30-day Average Withdrawal (gpd)
32	1/30/2022	195,487	168,299
33	1/31/2022	275,600	172,438
34	2/1/2022	189,774	172,623
35	2/2/2022	175,528	170,937
36	2/3/2022	168,481	171,657
37	2/4/2022	167,541	172,276
38	2/5/2022	166,587	172,688
39	2/6/2022	181,672	173,557
40	2/7/2022	164,225	173,868
41	2/8/2022	157,845	173,940
42	2/9/2022	151,488	173,038
43	2/10/2022	164,765	172,612
44	2/11/2022	172,721	172,856
45	2/12/2022	153,258	171,483
46	2/13/2022	164,788	168,128
47	2/14/2022	187,995	169,248

Bill Miller

AHE - Sustainability

For most projects, Commission staff would not recommend approval of a project at a rate that:

1. Exceeds historically tested rates;
2. Exceeds the maximum 30-day average at which the well was operated during dry or drought periods;
3. Results in utilization (individually and in combination with other sources) of more than 100 percent of the available 1-in-10 year drought recharge to the contributing groundwater basin; or
4. Would be expected to cause unacceptable lowering of the water level in the well or the aquifer.

Bill Miller

Sustainability / Risk-Based Approach

- Groundwater Availability
- Historical Testing
- Historical Operational Testing
- Remaining Data Gaps?

Bill Miller

Sustainability / Groundwater Availability

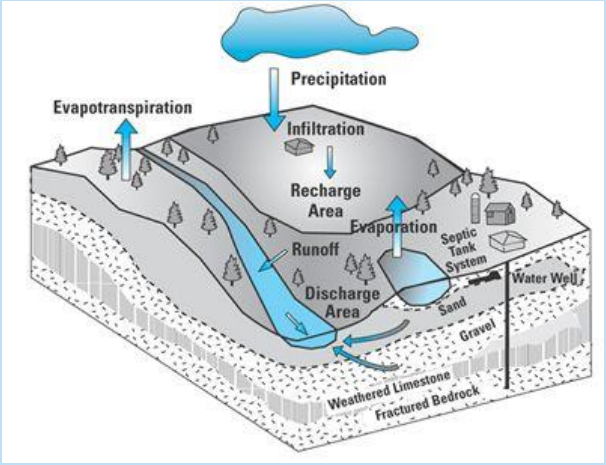
- How much is available?
  - Groundwater contributing area
  - Groundwater recharge rate: 1-in-10 year drought
- How much is already used?
  - Existing groundwater use

- Groundwater Availability Analysis is a preliminary, screening activity. The goal is to identify any potential issues that may need attention.

Bill Miller

Sustainability / Groundwater Availability

Contributing basin delineation – Development of the site conceptual model.



Bill Miller

Sustainability / Groundwater Availability

- Delineate the area that comprises the groundwater basin supplying a well.
- Groundwater basin is a general term used to describe a groundwater flow system that has defined boundaries.
- Use the basin area and the estimated recharge to estimate the groundwater availability

Bill Miller

Sustainability / Groundwater Availability

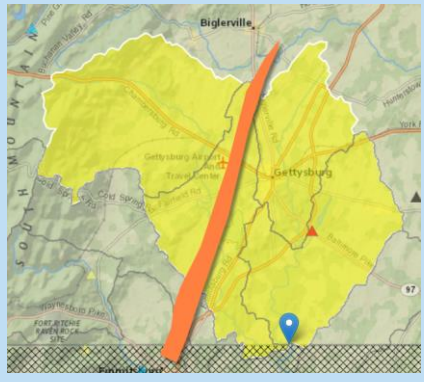
Basin Delineation:

Typically starts with a watershed delineation.

Refined to accommodate the 90-day projected area of influence and other factors.

Similar, but not identical, to a source water protection area delineation.

Provide discussion/evaluation for the delineation, including assumptions and limitations (data gaps).

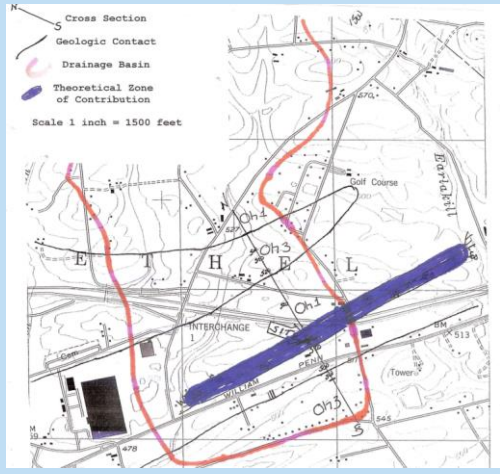


Bill Miller

Sustainability / Groundwater Availability

Basin Delineation:

The 90-day projected area of influence of a well should be considered when delineating the groundwater basin.



Bill Miller

Sustainability / Groundwater Availability

Estimating Recharge:

- Evaluate multiple sources/references.
  - Don't use an average rate
  - Select a rate and provide support for the selection
- Use 1-in-10 year drought recharge.
  - 60% of the 1-in-2 year recharge
- Provide references/sources reviewed and support of the selected recharge rate.

Bill Miller

Sustainability / Groundwater Availability

Summary:

- Basin delineation and groundwater availability should be developed in conjunction with the groundwater flow conceptual model, not adapted to "fit" the desired result.
- Use 1-in-10 year drought recharge
  - 60% of the 1-in-2 year recharge
- Provide references/sources reviewed and support of the selected recharge rate and contributing area.

Bill Miller

Sustainability / Historical Testing

Common historical testing limitations:

- Single well test
- Well not in its final form
- No or limited monitoring network
- Limited duration
- Limited recovery data

Bill Miller

Sustainability / Historical Testing

Why is it useful:

- Comparison of actual well behavior to that predicted by testing.
- Supports conceptual model?
- Provides one (or more) lines of evidence supporting sustainability evaluation.
- Provide evaluation and discussion of applicability of historical testing to AHE conclusions.
  - Don't simply attach a historical report and consider the form complete.

Bill Miller

Sustainability / Historical Testing

- Evaluate the 90-day projected drawdown.
- Evaluate the estimated area of influence (if observation well data is available)
- Evaluate the recovery data (t/t').
  - Recharge or recharge barrier?
  - Aquifer of limited aerial extent?
- Provide evaluation and discussion of applicability of historical testing to AHE conclusions.
  - Don't simply attach a historical report and consider the form complete.

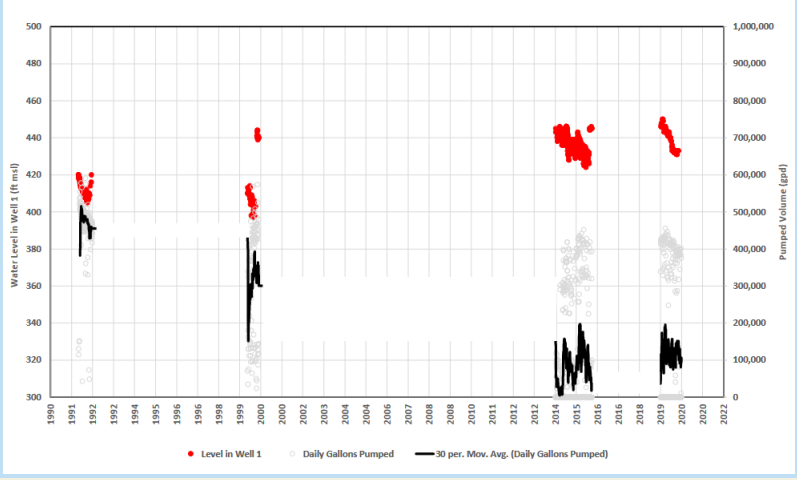
Bill Miller

Sustainability / Historical Operational Data

- Has the well been operated at the requested rate? During a drought period?
- Withdrawal data is good, but water level data is needed to evaluate sustainability.
- What is the time period of the data?
- Historical operational data can be more important than testing data.

Bill Miller

Sustainability / Historical Operational Data



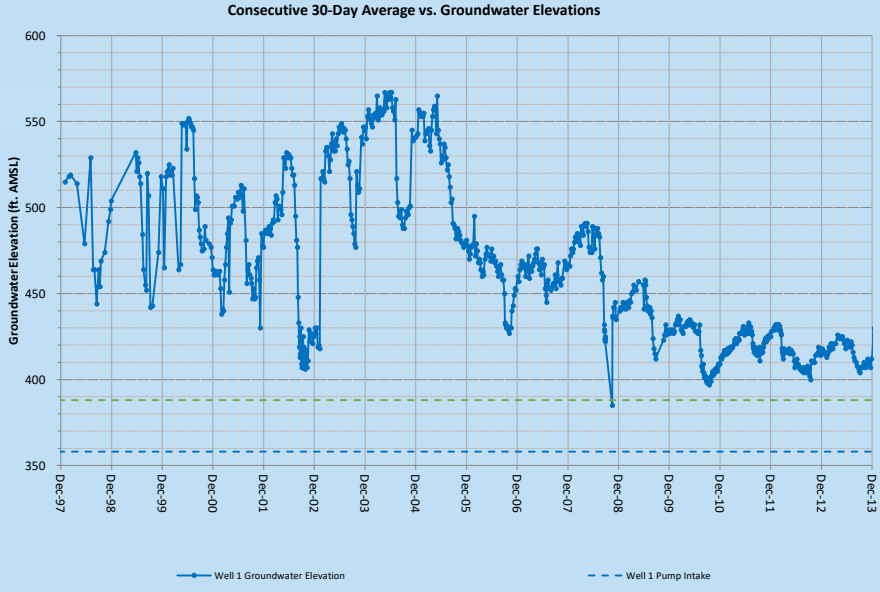
Bill Miller

Sustainability / Historical Operational Data

Evaluation:

- Does the operational data agree with historical testing data?
- Does the operational data show any long-term trends?
- Does the data support the conceptual model?
- Are there significant seasonal variations?

Bill Miller



Bill Miller

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Sustainability

- Provide data and evaluation.
- Legible, complete graphs are helpful.
- What are the assumptions and limitations?
- Show your work – any professional reviewing the AHE should come to the same conclusion

Date	Gallons/Day	Well Depth Readings
1/1/2018	47400	17.35
1/2/2018	36400	212.35
1/3/2018	35200	187.35
1/4/2018	49000	-102.65
1/5/2018	30300	47.35
1/6/2018	41300	-2.65
1/7/2018	46400	-147.65
1/8/2018	33500	-22.65
1/9/2018	47800	2.35
1/10/2018	31400	207.35
1/11/2018	42200	32.35
1/12/2018	39000	197.35
1/13/2018	36900	177.35
1/14/2018	33000	142.35
1/15/2018	46500	12.35
1/16/2018	28000	137.35
1/17/2018	57400	47.35
1/18/2018	24500	197.35
1/19/2018	26900	142.35
1/20/2018	43500	152.35
1/21/2018	56900	57.35
1/22/2018	52300	12.35
1/23/2018	41800	57.35
1/24/2018	39900	217.35
1/25/2018	41800	77.35
1/26/2018	43100	87.35
1/27/2018	55000	47.35
1/28/2018	50800	-90.65
1/29/2018	41800	57.35
1/30/2018	45200	227.35
1/31/2018	44700	137.35
2/1/2018	47000	57.35
2/2/2018	52100	37.35
2/3/2018	32500	137.35
2/4/2018	51800	-102.65
2/5/2018	28800	142.35

Bill Miller

Certificate of Completion

Please follow these steps to receive a certificate, documenting 1 hour of instruction, for today's webinar:

1) Email PWSAP at PWSAP@srbc.net.
   1) Reply to original Part 2 advertisement or;
   2) Reply to "one day away" or "day of" emails.
2) **Must use email address that was used to register for the webinar series.**
3) Include "Completion Certificate" in the subject line.
4) Send the email prior to 2:30 pm EST today.

Commission staff will compile the list of eligible attendees and send certificates in coming weeks.

Dave Haklar

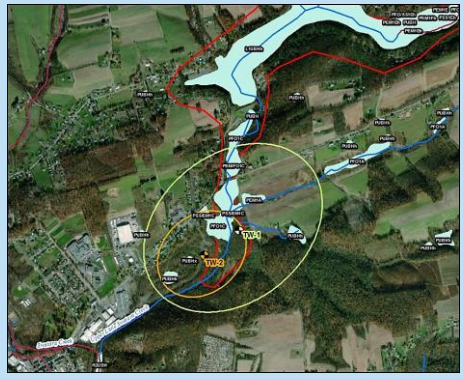
Risk Factor 3: Impacts to the Environment

- Identify environmental resources.
- Evaluate if potential impacts are likely.
- Determine if supplemental operational monitoring/ or testing is required.
- Resolve potential impacts.

Dave Haklar

Environmental Resource Screening

- Desktop approach utilizing agency databases.
- Screened to estimated 90-day projection AOI or 2,500 ft./ mile radius.
- Identifies delineated resources.
- Utilize aerial satellite imagery.



Dave Haklar

Available Environmental Resource Databases

Last Revised: 1/5/2022

Environmental Resource Information for Applications

The document provides references that the project sponsor should research and investigate to help assess the environmental impacts that may occur as a result of the proposed or existing project. Commission staff has compiled references that are useful for most projects; however, the following information should not be considered to be comprehensive and additional information may apply to a project. Accordingly, the project sponsor is required to fully evaluate potential environmental impacts that may result from the project.

Water Use Classification:
New York Pennsylvania Maryland

State 303(d) or Priority Waterbody List Status for Surface Waters:
New York Pennsylvania Maryland

Federal/State Wild and/or Scenic River:
Federal New York Pennsylvania Maryland

Aquatic Invasive Species (AIS):
New York Pennsylvania Maryland

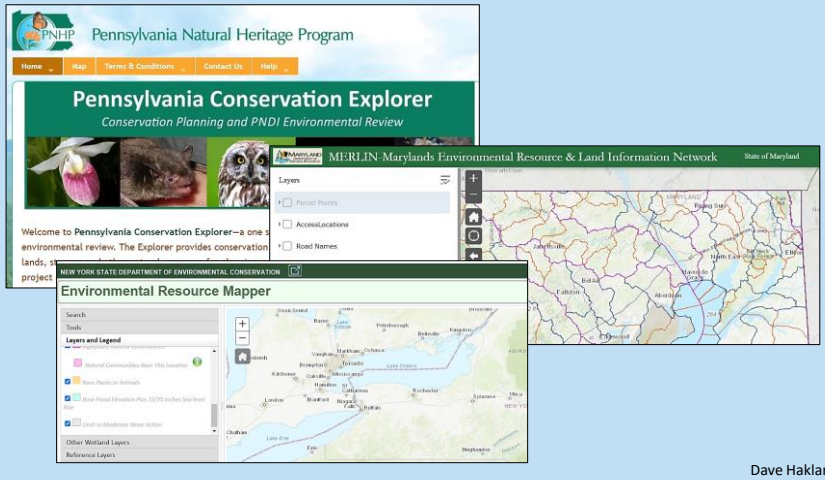
Naturally Reproducing (Wild) Trout:
New York Pennsylvania Maryland

Wetland Information:
New York Pennsylvania Maryland

A wetland may potentially be considered Exceptional Value (EV) [PA], Class I-IV [NY], or Nontidal Wetlands of Special State Concern [MD] and could require additional protective measures prescribed in state regulations below:

New York Pennsylvania Maryland

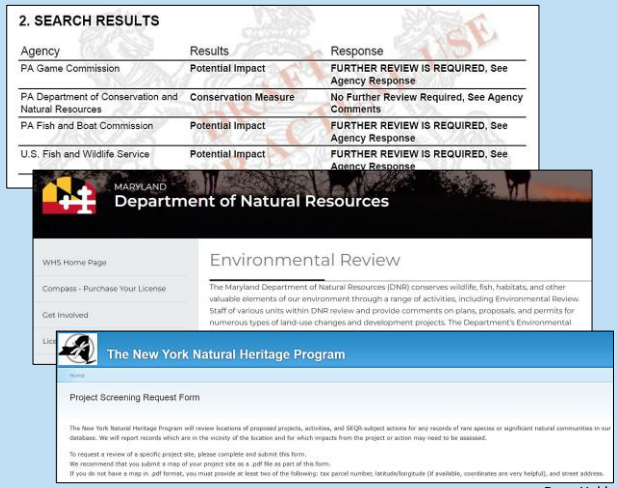
Rare, Threatened, and Endangered (RTE) Species Inventory:
New York Pennsylvania Maryland



Dave Haklar

Rare, Threatened, & Endangered (RTE) Species Inventory

- Required with AHE application.
- RTE species were not often identified/ considered.
- Elevate protection status of streams, wetlands, and natural communities.
- Can require agency coordination.
- If present, do the RTE species utilize on water resources?



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
PA Department of Conservation and Natural Resources	Conservation Measure	No Further Review Required, See Agency Comments
PA Fish and Boat Commission	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
U.S. Fish and Wildlife Service	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response

Dave Haklar

Streams, Rivers, Springs, & Ponds

- Location relative to AOI.
- Drainage area.
- Delineated hydrology.
- Water quality designations.
- Does the stream have a special protection designation?
- Presence of wild trout/ RTE species.

Dave Haklar

Wetlands

- Utilize National Wetlands Inventory (NWI).
- Location relative to AOI.
- Hydrology?
- Special protection designation?
- Presence of RTE species or habitat.
- Previous delineations?
- Can require agency coordination.

Dave Haklar

Site Visits

- Conducted by PSs and/or consultants.
- Field verify desktop resources.
- Could be result of agency coordination.

Dave Haklar

Impacts to the Environment

- Determining what features are present within the 90-day area of influence of the well and evaluating if potential impacts are likely.
- Data gaps are frequently an issue as historical data is generally not available.

Bill Miller

Impacts to the Environment

Evaluating impacts to the environment generally considers:

- Impacts to springs, streams, and wetlands
- Impacts to rare, threatened, or endangered species (RTE) that utilize on water resources
- Critical habitat and sensitive ecological communities
- Potential changes to water quality, an aquifer, or surface waterbody resulting from the withdrawal

Bill Miller

Impacts to the Environment

Evaluation:

- Absence of sensitive features within the 90-day area of influence.
- Hydrogeologic setting.
  - Isolating features
  - Evidence of different flow systems (groundwater elevations)
- Historical data
  - Drawdown magnitude
  - Seasonal considerations

Bill Miller

Impacts to the Environment

Projects may need operational monitoring or testing.

- Identified data gaps
- Monitoring and/or testing should be targeted based on AHE.

Bill Miller

Resolving Potential Environmental Impacts

- Agency Coordination - Must satisfy agency requirements.
- Supply agency clearance/ coordination responses to SRBC.

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

An element occurrence of a rare, candidate, threatened, or endangered species under our jurisdiction is known from the vicinity of the proposed project. However, given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence(s), no adverse impacts are expected to the species of special concern.

- Commission staff is available to assist projects in communicating with the appropriate governing agency to resolve or clear potential conflicts.

Dave Haklar

Additional Resources

General Project Review Questions
- Todd Eaby, teaby@srbc.net

Groundwater Projects
- Mike Appleby mappleby@srbc.net
- Bill Miller wmiller@srbc.net

Environmental Review
- Dave Haklar dhaklar@srbc.net

PWSAP
- Scott McFeaters smceaters@srbc.net
- Dave Haklar dhaklar@srbc.net
- Mike Appleby mappleby@srbc.net

Important References
- ☒ Groundwater Project Renewal Process Fact Sheet
- ☒ Operational Monitoring and Operational Testing Fact Sheet
- ☒ Water Level Monitoring Fact Sheet
- ☒ Alternative Hydrogeologic Evaluation Policy
- ☒ Functional Sample Templates
- ☒ Aquifer Testing Guidance
- ☒ Online Form Instructions

Questions & Additional Information
If you have questions or want to schedule a free pre-application meeting, please contact the Commission's Manager of Project Review or the Groundwater Supervisor

Mike Appleby

Up Next

- Part 3 – AHE Process: Commission Developed Voluntary Action Plans and Forms
  - *Thursday, March 24th, 2022 (1:00 - 2:30 pm)*
  - *Detailed discussion of Commission-developed Voluntary Action Plans*
    - *How we utilize the data*
    - *Data gaps and methods to resolve*
  - *Review processes and new elements of the AHE form*
- Classroom and/or virtual AHE workshop
  - *April – May 2022, targeting consultants*

Mike Appleby

Summary

- ***AHE does not count for renewal deadline***
- Develop site conceptual model – useful for all risk factors
- Start early and coordinate with Commission staff – starting with a pre-application meeting
- Data collection is often needed, but not for all risk factors
- Complete operational testing/ monitoring as needed

Mike Appleby