DRBC Storage Study Update

Water Management Advisory Committee: February 17, 2022

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Goal: to explore the feasibility of additional freshwater storage to meet future water availability, climate adaptation, drought management and flow management needs in the Delaware River Basin.

Objectives: Identify, inventory and evaluate the feasibility of options that could provide the following additional usable storage:

- A minimum of 1 billion gallons (BG),
- A minimum of 5 BG,
- A minimum of 10 BG
- A minimum of 20 BG

(The storage volumes can be met by a combination of projects/sources.)

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The DRBC has not made a determination of the need for additional storage within the basin. The study is a planning level inventory of potential options that would be available if the DRBC determines that additional storage is needed in the future.

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Storage Projects Not to be Considered:

* F.E. Walter Reservoir (outside study ongoing by the USACE)
* Tocks Island Reservoir or any other mainstem Delaware River dam
* Maiden Creek Reservoir (Maiden Creek upstream of Lake Ontelaunee, Berks County)
* Trexler Reservoir (Jordan Creek, Lehigh County)
* Hawk Mountain (East Branch Delaware River below Pepacton Reservoir)
* New York City Delaware Basin Reservoirs (exception: review of the feasibility of the expansion of one or more of the three reservoirs can be considered)

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* Mott MacDonald contract executed on April 9, 2021 ($649,000, ends June 30, 2022)

* Press release by DRBC on April 14, 2021

https://www.state.nj.us/drbc/home/newsroom/news/approved/20210414_storage-study.html

* Kick-off meeting – May 27, 2021

* DRBC webpage for the project went live in July 2021:

https://www.nj.gov/drbc/programs/flow/reservoir-storage-study.html

* Initial Screening Workshop – July 21, 2021
* Second Screening Workshop – November 18, 2021

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THIS MATERIAL IS DELIBERATIVE AND CONTAINS CONFIDENTIAL BUSINESS INFORMATION COMPILED FOR THE SOLE PURPOSE OF REVIEW BY THE DRBC COMMISSIONERS AND THEIR REPRESENTATIVES AS THEY EVALUATE THE NEED FOR ADDITIONAL WATER STORAGE IN THE BASIN AND DELIBERATE ON THE BEST OPTIONS FOR SECURING SUCH STORAGE IF NEED IS IDENTIFIED. PURSUANT TO 18 CFR 401.118, THIS DRAFT REMAINS DELIBERATIVE AND CONFIDENTIAL WHEN DISCLOSED TO OTHER GOVERNMENT EMPLOYEES FOR USE IN THEIR WORK IN COOPERATION WITH THE DRBC.

Types of storage projects being considered

July 2021 Screening Workshop

1. New dams

- Previously identified locations
- Newly identified locations

2. Modifications to existing dams/reservoirs:

- Dam raise
- Purchase/lease of existing storage
- Operational changes
- Dry dam to permanent pool

3. Quarries

4. Subsurface mine with surface pool

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Results of Initial Screen of Potential Storage

1. New dams

- DATA IN
  - 21 Previously Studied Dams
  - Various Team identified
- DATA OUT (Screened)
  - Based on semi-quantitative criteria
  - 5 high potential new dams
  - 2 “New” identified sites

2. Modification to existing dams/ reservoirs:

- DATA IN
  - 24 Candidate Sites
- DATA OUT (Screened)
  - Based on semi-quantitative criteria
  - 16 high potential sites

3. Quarries:

- DATA IN
  - >1300 Quarries in 3 states
- DATA OUT (Screened)
  - Based semi-quantitative criteria
  - 24 potential sites
  - Reassessed for “Abandoned Quarries” – 33 potential sites

4. Deep Mines:

- DATA IN
  - 31 Mine Pools in DRB
- DATA OUT (Screened)
  - Based on semi-quantitative criteria
  - 5 high potential sites

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Summary: Plausible Storage Projects for Further Evaluation

July 2021 Screening Workshop

○ New dams	
○ Previously identified locations:	0 to 5
○ Newly identified locations:	~4
○ Modifications to existing dams/reservoirs	
○ Dam raise:	15
○ Purchase/lease or existing storage/operational changes:	5
○ Dry dam to permanent pool:	2
○ Quarries	24
○ Subsurface mine water with surface pool	~5
TOTAL	~56

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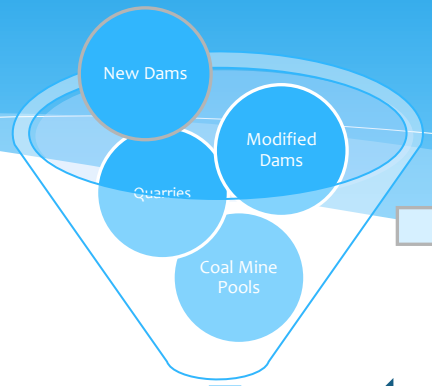
Supplemental Screening

GATE 1A:
MANDATORY CRITERIA
Culling by Size
Screening with Limited Data



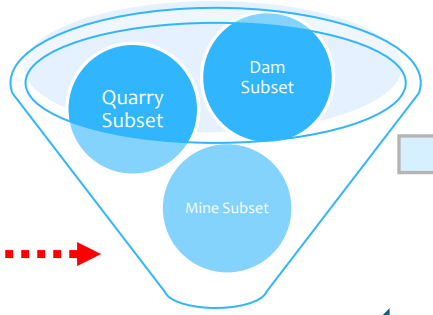
Site not Viable

OPTIONS DISCARDED BASED ON CULLING AND TECHNICAL ISSUES

Additional Staff Input on Workshop #1 Details (Additional Screening)

GATE 1B:
SUPPLEMENTARY CRITERIA
SEMI-QUANTITATIVE ASSESSMENT

Storage Opportunity Research
- Specific storage details
- Owner/Operator Interface
- Further details from cross referenced databases
- Early concept development



Site not Viable

OPTIONS DISCARDED BASED ON SEMI-QUANTITATIVE SCREEN AND TECHNICAL ISSUES

Additional Staff Input

REDUCED DATASET FOR DETAILED EVALUATION → CONCEPT STORAGE OPPORTUNITIES → PRIORITIZED PROJECTS

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New Dams

PREVIOUSLY IDENTIFIED SITES FOR NEW DAMS

Map key	Project Name	County	Subwatershed	New Capacity, BG	Flooded Area, ac
1	Hawley	Wayne	Lackawaxen	?	394
2a	Equinunk (small)	Wayne	Upper DR	10	485
2b	Equinunk (large)	Wayne	Upper DR	43	1358
3	Little Martins Creek	Northampton	Middle DR	29	1122
4	Red Creek	Schuylkill	Schuylkill	26	1282
5	Milanville	Wayne	Lackawaxen	43	1979

NEW SITES FOR NEW DAMS
- Silver Creek
- Rattling Run

Expected to carry ~7 concepts forward.

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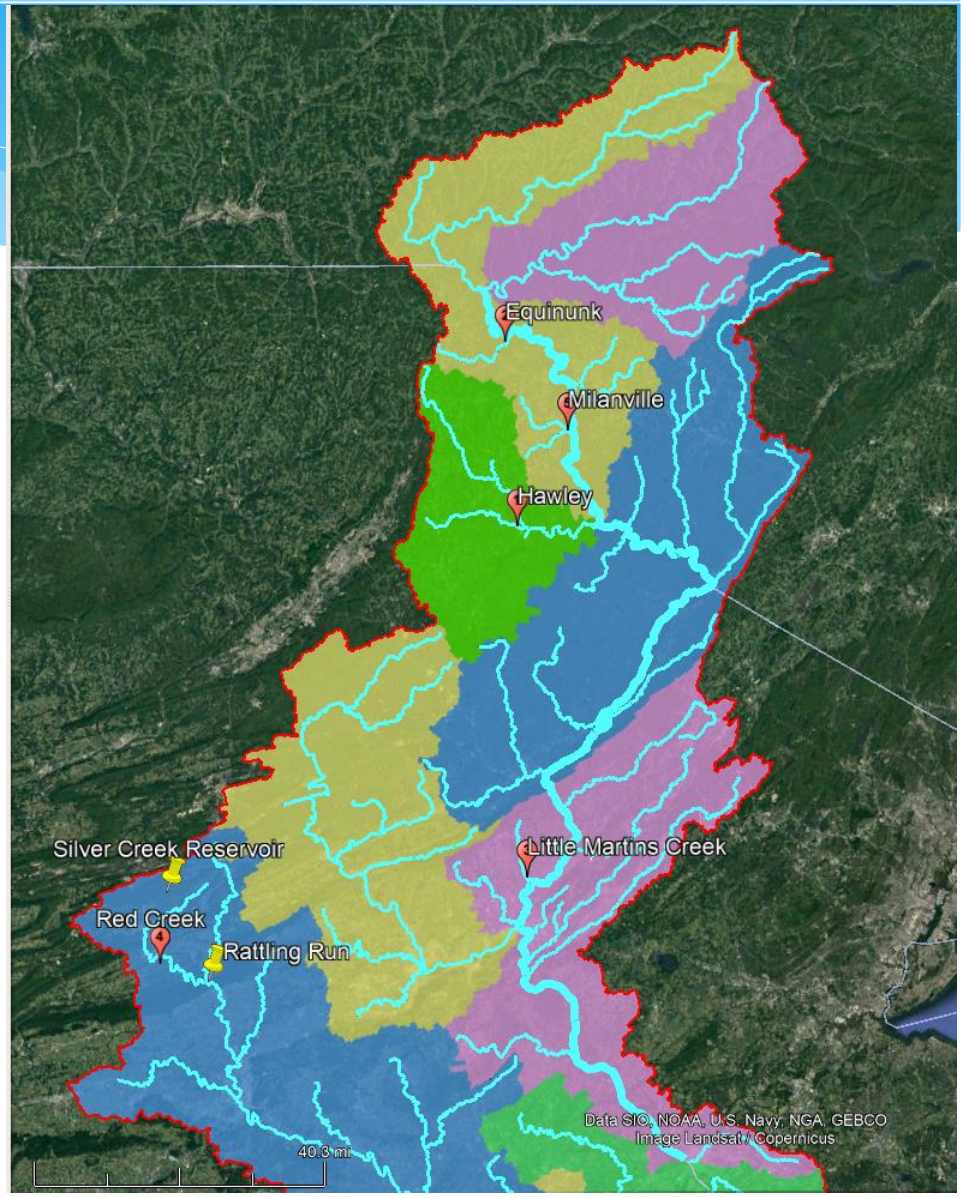

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Existing Dams

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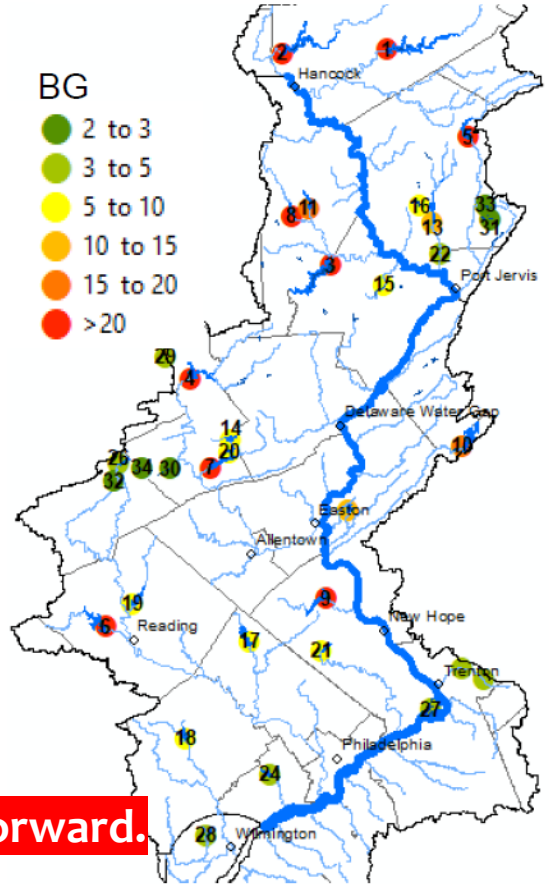
34 reservoirs > 2 BG maximum storage

Existing Dams are being evaluated for both "Dam Raising" and "Purchase/Lease" of existing storage.



1 BG = ~3000 ac-ft

Ranked by volume

ID	NAME	MAX STORAGE, BG
1	PEPACTON (DOWNSVILLE) DAM	199
2	CANNONSVILLE	142
3	WALLENPAUPACK (TAFTON DIKE)	88
4	FRANCIS E WALTER DAM	52
5	NEVERSINK RESERVOIR DAM	46
6	BLUE MARSH DAM	42
7	BELTZVILLE DAM	34
8	PROMPTON DAM	24
9	NOCKAMIXON	23
10	LAKE HOPATCONG DAM	16
11	JADWIN	15
12	MERRILL CREEK MAIN DAM	15
13	MONGAUP- SWINGING BRIDGE	12
14	PENN FOREST	9
15	SHOHOLA MARSH	9
16	MONGAUP -- TORONTO	8
17	GREEN LANE RESERVOIR	8
18	MARSH CREEK RESERVOIR (PA-437)	8
19	LAKE ONTELAUNEE	7
20	WILD CREEK	6
21	PEACE VALLEY (PA-617)	6
22	RIO	5
23	ASSUNPINK #20 DAM	5
24	SPRINGTON (GEIST)	4
25	ASSUNPINK # 6 DAM	4
26	STILL CREEK	4
27	VAN SCIVER LAKE	4
28	EDGAR M. HOOPES DAM	4
29	CRYSTAL LAKE DAM 3	3
30	MAUCH CHUNK LAKE (PA-462)	3
31	YANKEE LAKE DAM	2
32	LOCUST CREEK (PA-423)	2
33	WANAKSINK LAKE DAM	2
34	LAKE HAUTO	2

Owners

Owner	Number	Dams
USACE	5	Walter, Blue Marsh, Beltzville, Prompton, Jadwin
PA	5	Mauch Chunk, Shohola, Nockamixon, Marsh Creek, Locust Creek
NJ	2	Hopatcong, Assunpink
NYCDEP	3	Pepacton, Cannonsville, Neversink
Other Public water utility	6	Penn Forest and Wild Creek(Bethlehem), Peace Valley(Bucks County), Still Creek(Tamaqua), Ontelaunee(Reading), Hoopes (Wilmington)
Power company	4	Mongaup Swinging Bridge, Toronto and Rio (Eagle Creek), Wallenpaupack
Private water company	4	Green Lane and Geist (Aqua PA), Crystal Lake (PA Am Water), Merrill Creek
Private lake	4	Hauto, Wanaksink, Van Sciver, Yankee
County Park	1	Mercer County Lake

Expected to carry ~13 concepts forward.

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Quarries

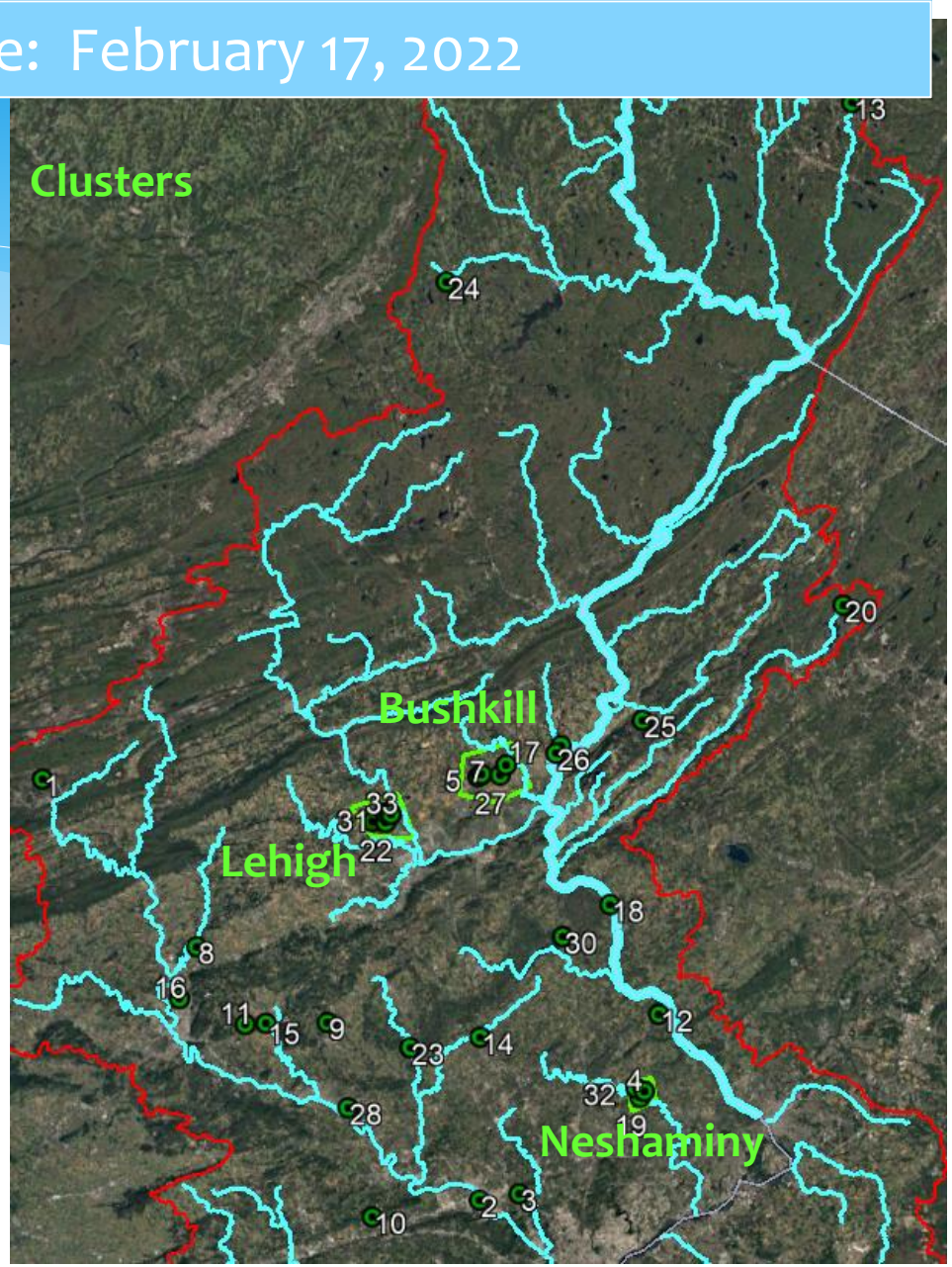
Started with >1,300 sites

Screened down to ~ 33 based largely on volume

three "clusters" have emerged

need to eliminate a few more

Expected to carry ~19 concepts forward.



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Mines

Reviewed existing information from PADEP, USBM, EPCAMR, Schuylkill Headwaters Association, SRBC

Begin to develop project concepts.

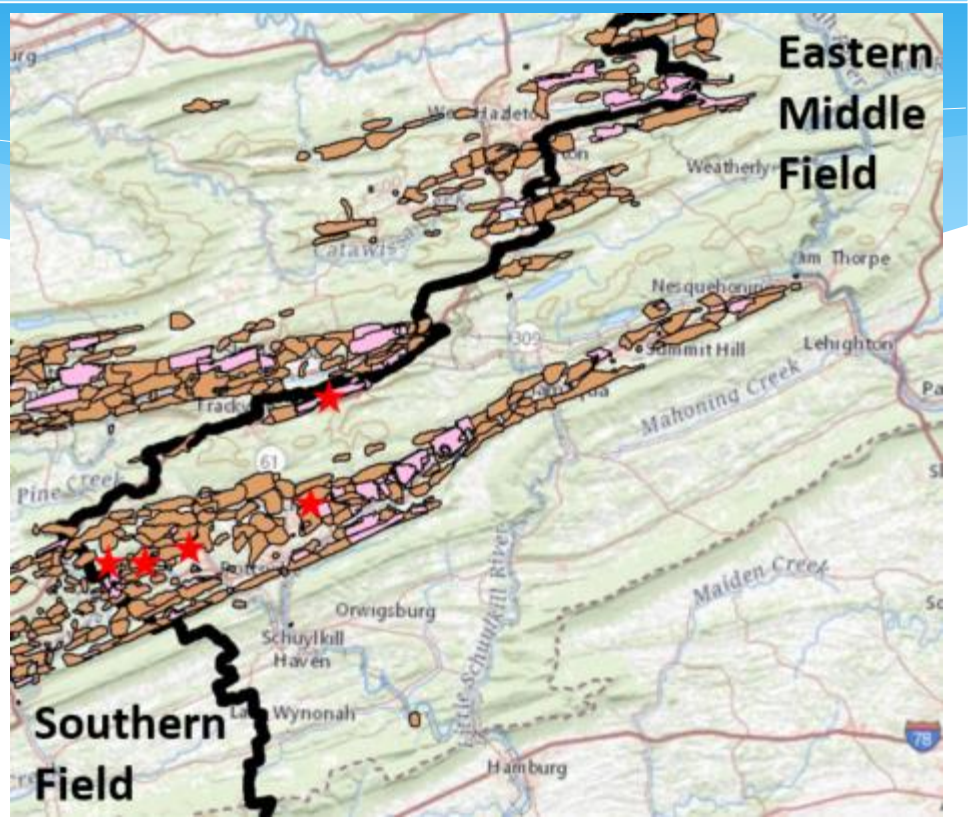
Expected to carry ~5 concepts forward.

South Anthracite Field			
Key	Pool	Vol. (gal)	
1	Tamaqua Lands (S)	800,000,000	
2	Tamaqua Lands (N)	312,000,000	
3	Mary D	400,000,000	
4	Kaska	600,000,000	
5	Silver Creek	1,774,000,000	X
6	Eagle Hill	727,000,000	
7	Palmer Vein	400,000,000	
8	Bear Ridge	40,000,000	
9	Pine Fores	419,000,000	
10	Wadesville	3,582,000,000	X
11	Pottsville East	125,000,000	
12	Pine Knot #1	600,000,000	
13	Thomaston	784,000,000	
14	Richardson	625,000,000	
15	Glendower	403,000,000	
16	Buck Run (old)	477,000,000	
17	Buck Run (dam basin)	53,000,000	
18	Lytle	795,000,000	
19	Phoenix Park	2,054,000,000	X
20	Otto	2,265,000,000	X
21	Middle Creek	700,000,000	
	Total	**17,935,000,000**	

Eastern Middle Anthracite Field			
Key	Pool	Vol. (gal)	
24	Audenreid	241,844,000	
25	Spring Brook	5,880,000	
26	Tresckow	17,280,000	
27	Tresckow #21	84,240,000	
29	Coleraine	67,860,000	
29	Evans	20,160,000	
31	Silver Brook	683,000,000	
	Total	**1,120,264,000**	

Western Middle Anthracite Field			
Key	Pool	Vol. (gal)	
#	Morea	2,679,000,000 #	X
NA	**Total**	**2,679,000,000#**	

Note: Volumes taken from USBM TP #727-1949; # denotes value from USGS SIR 2010-5261.



Name	Region	Estimated Volume (BG)
Silver Creek	South Anthracite Field	1.8
Wadesville	South Anthracite Field	3.6
Phoenix Park	South Anthracite Field	2.1
Otto	South Anthracite Field	2.3
Morea	Western Middle Anthracite Field	2.7

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Most discussions to date with outside parties have involved owners of existing storage to explore the possibility of the acquisition of "**excess storage**" and/or the feasibility of **expansion** of an existing reservoir.

Initial reviews also indicate that there may be opportunities in **quarries** and **deep mines** (anthracite) that haven't been previously evaluated.

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Next Steps

* Continue to work with MM on screening & evaluation criteria
* MM developing Storage Project Summaries (SPS) for ~40 projects
* March 2022 : Commissioner Caucus update
* ~ April 2022 – next Screening Workshop
* Summer 2022 – Final Report (top 10 projects)

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