Battle of the Atlantic Research & Expedition Group

Activity Report

Reconnaissance Dive:
Quarry Gardens, Schuyler, Virginia
27 April 2025

Summary

BAREG Quarry Gardens Recce – 27 APR 2025

Eleven Battle of the Atlantic Research & Expedition Group (BAREG) divers participated in reconnaissance (recce) dives in two decommissioned soapstone quarries at the Quarry Gardens (QG) (https://quarrygardensatschuyler.org/about/) in Schuyler, VA. The purpose of the dives was to determine if any significant cultural resources could be found in the quarries, and if so, to return to the site for a detailed survey. Two dive teams explored the smaller South Quarry and three teams dove the North Quarry. Both quarries have high walls on their eastern and northern sides, and diver entry/exit on the western sides was complicated by a deep and thick margin of submerged fallen trees and branches.

Water temperatures ranged from the mid-to-high 60 degrees (F) at the surface to 42 degrees at the bottom. Visibility at the bottom ranged from less than one foot to three feet. At the quarries' bottoms there was a thick layer of small branches, leaves, and other plant detritus. This layer concealed any quarrying equipment and infrastructure (e.g., rail tracks for moving cut stone) that might be lying on the deeper rock bottom. One possible "iron rail" was found by a dive team in the South Quarry. In the North Quarry, divers found trash in the form of plastic bottles, tires, and a refrigerator, and these are likely a legacy of the quarry's post-mining role as a community dumpsite.

No significant and mappable submerged cultural resources were found in the quarries during the recce dives. A follow-on detailed underwater archaeological survey of the quarries' bottoms would not document features associated with historic soapstone quarrying. However, structural features of the quarries, most notably the stone buttresses left in place to hold up the eastern soapstone faces might be the subject for a follow-on dive.

The BAREG Quarry Gardens Survey

Background

The Quarry Gardens (QG) is a public garden located in Schuyler, Virginia, centered on two decommissioned soapstone quarries that ceased operations in the mid-1970s. In August 2024, Bill Chadwell, BAREG member and Director Emeritus, discussed diving the QG's flooded quarries with the facility's Director of Operations, Rachel Floyd. Ms. Floyd invited BAREG to dive and explore the quarries. The purpose of the dives would be to find out if artefacts and infrastructure from the soapstone quarrying operations remained in the two quarries. For BAREG, diving the QG quarries would provide an opportunity to refresh underwater survey skills. In the Fall of 2024, the survey was proposed to the BAREG board and it received approval as a group project.

Planning

The project was presented to the BAREG membership at the group's annual symposium in January, 2025. Eleven members responded to the call for divers to support a reconnaissance (recce) dive survey of the QG in the Spring of 2025. QG and BAREG set the recce date for 27 April and the dive operations plan was briefed to the dive team via a Zoom meeting on 19 April.

Survey Objectives

Conduct a reconnaissance of the site's two quarries to:

(1) Determine if there are significant mappable features for a future detailed survey
(2) Produce a mud/sketch map of the two quarries

Survey Operations

The divers arrived on site at 0900 on the day of the survey and they received a QG orientation brief and guided walkabout from the QG Director of Operations. This was followed by a safety and tasking briefing by BAREG's Operations Coordinator at the QG Visitor's Center. The five dive teams then staged their equipment near the entry points (see Appendix A) and geared up for the dive. All divers dove open circuit with seven diving with double tanks and four on single tanks, and all dove in drysuits.

<u>North Quarry</u>

Three teams dove the North Quarry and they were assigned the following tasks:

Team 4 – Measure the quarry's perimeter at the bottom
Team 2 – Search bottom for artefacts and infrastructure
Team 5 – Search bottom for artefacts and infrastructure

The North Quarry entry point was a notch on the western side of the quarry where a paddle boat is moored. Dive Team 5 was first to enter the North Quarry and the divers immediately encountered a dense barrier of submerged tree trunks and branches. The steep bottom off the shore caused the divers to drop waist-deep into the branches and it took some time and effort to clear the barrier (see Photos 1 & 2). Dive Teams 2 and 4 also struggled with the barrier at this entry point. The divers exited at a point further south where there was less debris.

The bottom of the North Quarry is a layer of forest plant detritus, mostly leaves and twigs. Dive Team 2 and 5 probed the bottom biomass to find the quarry's stone floor, but it was beyond reach by hand. Dive Team 2 reached a depth of 57 feet in the SE quadrant of the quarry, and this was the maximum depth reached by the North Quarry divers. The teams found debris on the bottom that was likely deposited in the quarry after it was flooded and when it served as a community dump site from the mid-70s to the mid-80s. This debris was primarily tires and plastic bottles. No artefacts or infrastructure associated with soapstone quarrying were detected. Dive Team 4 found it impossible to measure the quarry perimeter at the bottom due to the barrier of tree branches and trunks.

South Quarry

Two teams dove the South Quarry and they were assigned the following tasks:

Team 1 – Measure the quarry's perimeter at the bottom
Team 3 – Search bottom for artefacts and infrastructure

The South Quarry entry point was adjacent to an unpaved track where the water's edge was nearly level with the shore. The divers had to cross a belt of biomass, including tree branches, but not so dense as the barrier in the North Quarry. However, east of the entry point the divers encountered a thick belt of tree trunks and branches along the quarry wall. This barrier prevented Team 1 from accessing the bottom perimeter of the quarry. The team took measurements where possible and surfaced to check their position in the quarry using a Surface Marker Buoy (SMB) for reference (see Photo 4).

Dive Team 1 also conducted a bottom search and reached a maximum depth of 65 feet in the quarry's SE quadrant. The team reported finding an iron rail in the quarry's SW quadrant, but it is unclear if this is a quarrying artefact or post-mining debris. The rail is oriented east-west, and if it is a remnant of soapstone mining it is the only one located in the recce. Dive Team 3 also reported difficulty reaching the quarry wall at the bottom because of the tree debris. They also reported an uneven bottom in the South Quarry.

General Site Observations

All five dive teams noted the thermocline at about 13 feet as they descended through the water column and a bottom temperature in the low 40s° F. Diver reports of visibility just below the surface ranged widely from three feet to fifteen feet. The difference may be due to the presence of pond scum (see Photo 3) and suspended particles where the divers descended. Visibility at the bottom ranged from less than one foot to four to five feet. This range is likely due to the bottom disturbance stirring up sediments. However, the greater visibility, reported by one team in the North Quarry, could be due to spring water entering the quarry.

Findings

1. No significant artefacts or infrastructure associated with soapstone quarrying were located during the recce. One possible iron rail was found in the South Quarry, but its association with soapstone quarrying is unclear.
2. A dense margin of tree trunks and branches is present in both quarries, primarily along the north and east walls. The trees and branches made it difficult to obtain accurate measurements of the quarries' dimensions at the bottom.
3. Cultural features observed in the North Quarry (tires, plastic bottles, refrigerator) likely date from when the quarry was used as a dump site.

Recommendations

1. Recommend not conducting a detailed underwater archaeology survey. The lack of mappable cultural features associated with the site's past as a soapstone quarry makes a more detailed survey of little value.
2. Recommend a small team dive the quarries when visibility is optimal to collect photos and video. Additional dives for the purposes of underwater photography and videography could provide imagery of the submerged aquatic environment. These images, with curation, could be used to inform visitors about the underwater component of the Quarry Gardens. Additionally, this team could investigate the iron rail to determine if it is an artefact of quarrying and part of the South Quarry's mining infrastructure.

Observation

The Quarry Gardens is a unique site that preserves native flora, and as such, it should not be developed to support recreational diver activities. Developing the Quarry Gardens as a dive site would require clearing entry and exit points, and providing areas for staging dive equipment and for diver gear-up. Increased foot traffic at stage areas, and entry and exit points would not be compatible with the mission of the Quarry Gardens.

Acknowledgements

BAREG was given the opportunity to be the first divers to dive QG quarries through the efforts of Bill Chadwell and Rachel Floyd, QG Director of Operations. Our thanks to Bill for proposing the survey, and our thanks to Rachel Floyd and Devin Floyd at QG for giving BAREG access to the quarry and for hosting the team on the day of the dive.

Photo 1. Dive Team Five entering the North Quarry via notch in west side.

Photo2. Dive Team Five member struggles with submerged tree branches.

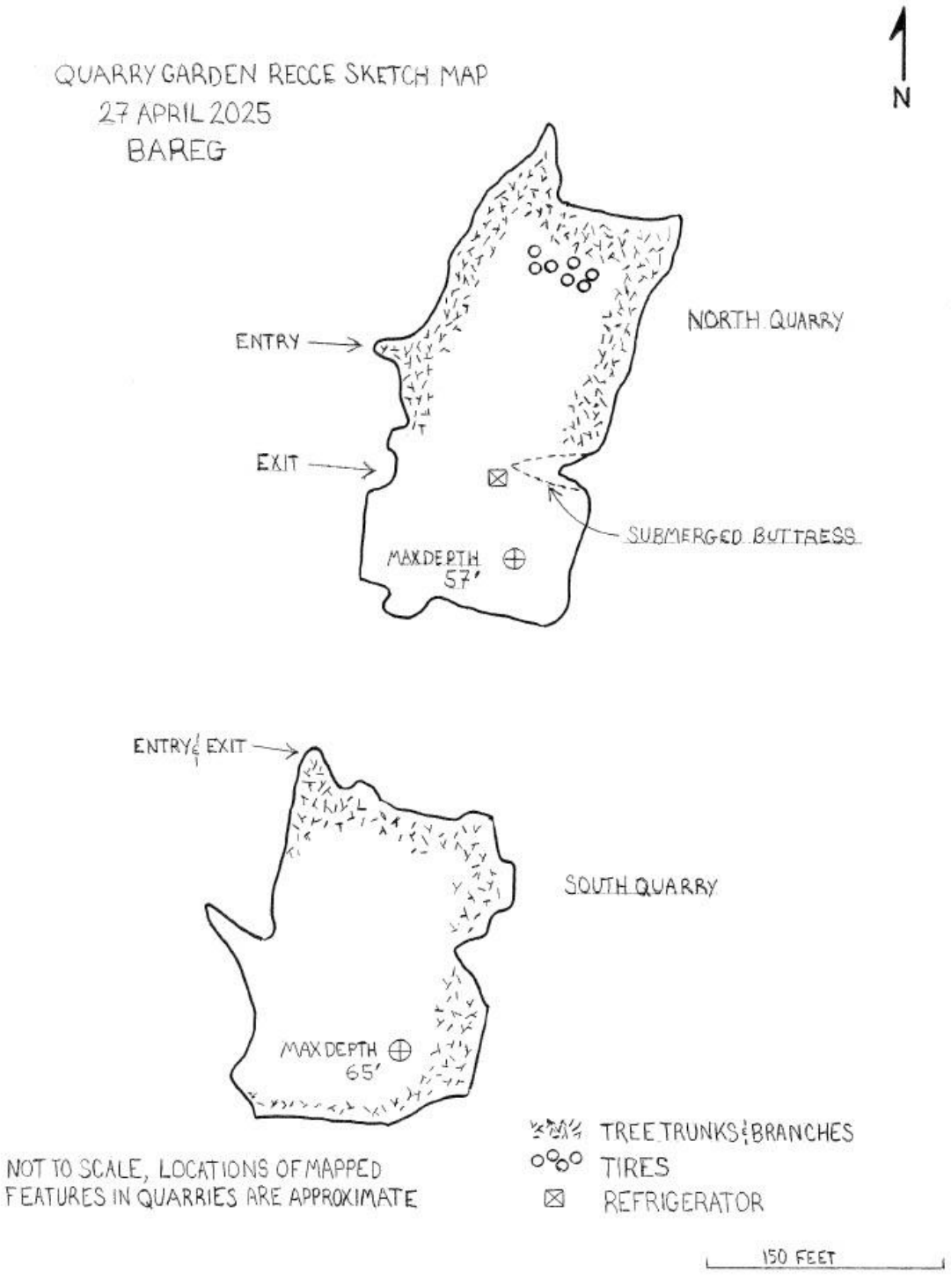
Photo 3. Dive Team Three member enters the South Quarry at its NW corner.

Photo 4. A yellow submerged marker buoy indicates the position of a Dive Team One Diver in the South Quarry.

Photo 5. BAREG Dive Team (L to R): Sam Abbe, Mike Pope, Jay Lytell, Dave "Reggie" Hammond, Bill Ralph, Bill Chadwell, Brian Wohler, Lisa Abbe, Fred Engle, Jason Nunn, Alex Krizan, Joe Hoyt.

Appendix A

Sketch Map



Appendix B

Dive Team Reports

Dive Team One

Divers: *Alex Krizan, Jay Lytell*

Quarry dove (N or S): *S*

Entry & Exit Points: *NW corner*

Dive Data
- Run time: *1 hour*
- Max depth: *65 ft*
- Average depth: *30 ft*

U/W conditions
- Viz at three feet: *3 ft*
- Viz at bottom: *1 ft*
- Water T (F°)
  - Surface: *58°*
  - Bottom: *42°*
  - Thermocline depth: *15 ft*

Description of quarry subsurface features
- Sides/slopes (steep/gentle, bare solid rock or broken rock, debris (e.g., tree branches)): *Sheer with large amounts of tree debris on North side. Sheer with little tree debris on West side. Sloping with some tree debris on south and west side.*
- Bottom: *Muck*
- Quarry structure (include features such as wall or buttress): *Buttress on eastern face. Measurements taken*

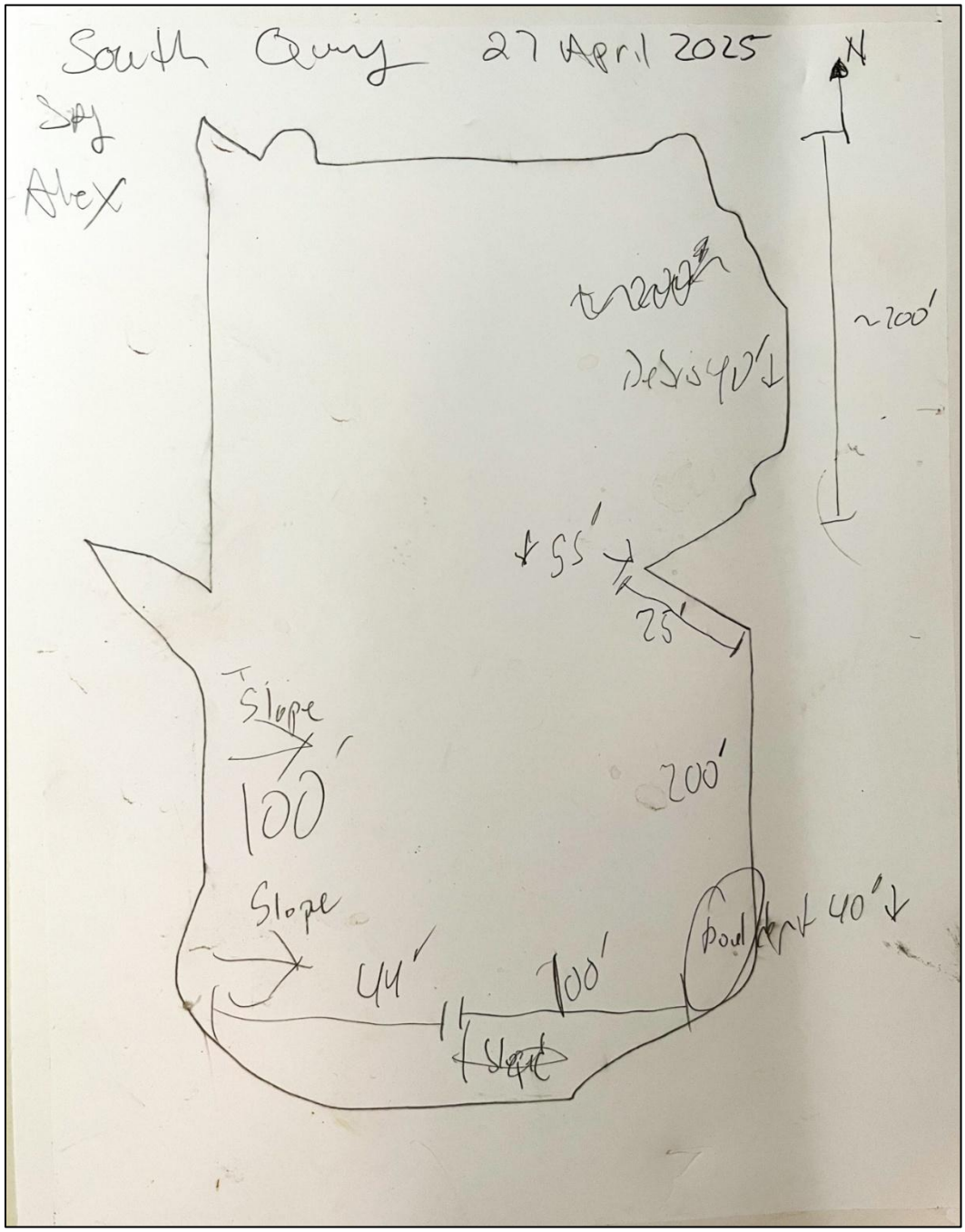
Observations
- Flora/vegetation: *Not observed*
- Fauna: *Not observed*
- Artifacts (to include trash (e.g., plastic jugs, refrigerator, tires)): *Some iron rail was found that may have been from carts used to move stone.*

Brief description of dive:

Alex: After entry at the northwest corner, we started to measure the north side of the quarry. Due to the amount of tree debris making an accurate measurement at depth difficult we resurfaced and decided to use the northwest corner as a starting point due to its more solid nature of being carved out from rock as opposed to the sloping soft earth and muck corner we entered. Starting from there we found visibility to be best at 30 feet and spent most of our dive there. At certain points during our measurements, we went to the bottom to confirm depth. We continued around the perimeter of the quarry in a clockwise manner until about halfway up the West side of the quarry when we hit the run time that we were to report back in at.

Jay: Dive plan was to go to a depth of 30 feet and begin to take measurements of quarry, immediately ran into falling trees that hindered this process. Made several attempts but continued to run into entanglement hazard. Surfaced with dive buddy and discussed a course of action. Surface swam to the North Corner of rock wall and dropped to 30 feet; we began taking measurements along the eastern wall of quarry until we reached our planned dive time. We measured roughly half or the circumference of the south quarry. The conditions were cold and dark; the vis was about 1-2 feet for me at the bottom.

Dive Team One Mud Map



Dive Team Two

Divers: *Reggie Hammond, Brian Wohler*

Quarry dove (N or S): *N*

Entry & Exit Points: *Entry at the paddle boat. Exited on the same side as the paddle boat but further south than the entry point.*

Dive Data

Run time: *49 minutes*
Max depth: *57 ft*
Average depth: *35 ft*

U/W conditions

Viz at three feet :*15 ft*
Viz at bottom: *3 ft*
Water T (F°)
Surface: *70°*
Bottom: *42°*
Thermocline depth: *13 ft*

Description of quarry subsurface features

Sides/slopes (steep/gentle, bare solid rock or broken rock, debris (e.g., tree branches)): *Steep sides on most places with trees and branches. The surface was covered with organic debris that when disturbed greatly reduced visibility.*
Bottom: *The bottom was covered with organic debris that when disturbed greatly reduced visibility.*
Quarry structure (includes features such as wall or buttress): *None noted*

Observations

Flora/vegetation: *Not observed*
Fauna: *Not observed*
Artifacts (to include trash (e.g., plastic jugs, refrigerator, tires)): *Plastic bottles random small pieces of metal (most likely discarded appliances).*

Brief description of dive:

Entered the water at the boat. Stepped into an underwater hole several feet deep. Very difficult to get out of the hole. The dive was dark and cold.

Dive Team Three

Divers: *Sam Abbe, Lisa Abbe*

Quarry dove (N or S): *S*

Entry & Exit Points: *Entry and exit points were a clearing off one of the trails. The bottom was soft mud, with debris, which consisted of leaves, branches, sediment, and rocks.*

Dive Data

Run time: *45 minutes*
Max depth: *~60 ft*
Average depth: *~40 ft*

U/W conditions

Viz at three feet: *~15 ft*
Viz at bottom: *0*
Water T (F°)
Surface: *~70°*
Bottom: *~42°*
Thermocline depth: *13 ft*

Description of quarry subsurface features

Sides/slopes (steep/gentle, bare solid rock or broken rock, debris (e.g., tree branches)): *The sides were a gradual incline due to debris. Many tree branches.*
Bottom: *Large rocks on the bottom, as well as what appeared to be cement structures with rebar.*
Quarry structure (include features such as wall or buttress): *The wall was difficult to get close to past 15 ft due to the large tree structures.*

Observations

Flora/vegetation: *There were many particulates in the water, which stirred up easily regardless of making contact or not. It is believed this was not isolated to the muddy bottom, but also to the large amount of vegetation on the bottom, i.e., trees, branches, and decomposition. Did not observe any grass.*
Fauna: *Did not observe any Fauna.*
Artifacts (to include trash (e.g., plastic jugs, refrigerator, tires): *The following artifacts were found: three tires, one ornate chair that still had some fabric on it.*

Brief description of dive:

The entry point of the quarry was a combination of mud and marsh. First few steps, we sunk about 6-8 inches, getting caught on small branches. The water temperature was comfortable. There was no odor coming from the water. Upon descending, the first thermocline was at approximately 13 feet, and the water temperature dropped dramatically. Visibility diminished quickly, from 10 feet to zero. It was challenging to get to the wall due to the amount of debris, i.e., trees and branches. The soapstone was soft to the touch, almost like a clay consistency, and did not flake off as we anticipated. The grid search pattern consisted of many ascending and descending due to rock formations and debris.

Dive Team Four

Divers: *Mike Pope, Bill Ralph*

Quarry dove (N or S): *N*

Entry & Exit Points: *In and out at the paddle boat on the west shore. Thick mud underwater where the boat was made it challenging to get in and out.*

Dive Data
- Run time: *20 minutes*
- Max depth: *41 ft*
- Average depth: *33 ft*

U/W conditions
- Viz at three feet: *4-5 ft*
- Viz at bottom: *2-3 ft*
- Water T (F°)
  - Surface: *65°*
  - Bottom: *48°*
  - Thermocline depth: *10-13 ft*

Description of quarry subsurface features
- Sides/slopes (steep/gentle, bare solid rock or broken rock, debris (e.g., tree branches)): *Slopes from just below the surface were filled with tree branches.*
- Bottom: *Mud*
- Quarry structure (include features such as wall or buttress): *On the north side of the north quarry there was a shelf around 10 ft deep. It was a foot or so wide*.

Observations
- Flora/vegetation: *Dead tree branches*
- Fauna: *None seen*
- Artifacts (to include trash (e.g., plastic jugs, refrigerator, tires): *None seen*.

Brief description of dive:

Did not see anything on the north end of the north quarry. The dead tree branches impeded the ability to get a measurement of the sides of the quarry.

Dive Team Five & Dive Supervisor

Divers: *Joe Hoyt, Jason Nunn, Fred Engle (Dive Supervisor)*

Quarry dove (N or S): *N*

Entry & Exit Points: *Entered the water via the notch in the west side of the quarry where a paddle boat is moored. The entry was a bit difficult due to the thick belt of submerged tree trunks and branches. Exited at a point on the west side south of the notch where there were few branches.*

Dive Data

Run time: *27 minutes*
Max depth: *46'*
Average depth: *33 ft*

U/W conditions

Viz at three feet: *5 ft*
Viz at bottom: *<1 ft*
Water T (F°)
Surface: *65°*
Bottom: *42°*
Thermocline depth: *12 ft*

Description of quarry subsurface features

Sides/slopes (steep/gentle, bare solid rock or broken rock, debris (e.g., tree branches)): *North quarry was fringed with tree trunks and branches lying just below the surface.*
Bottom: *Decayed and decaying plant matter, primarily leaves and twigs.*
Quarry structure (include features such as wall or buttress): *A narrow notch on the west wall provided access to the water's surface. A prominent buttress props up the east wall of the North Quarry. Below the surface the buttress forms a sloping triangular shelf down to 19 feet. Below that the buttress narrows to a point at 29 feet.*

Observations

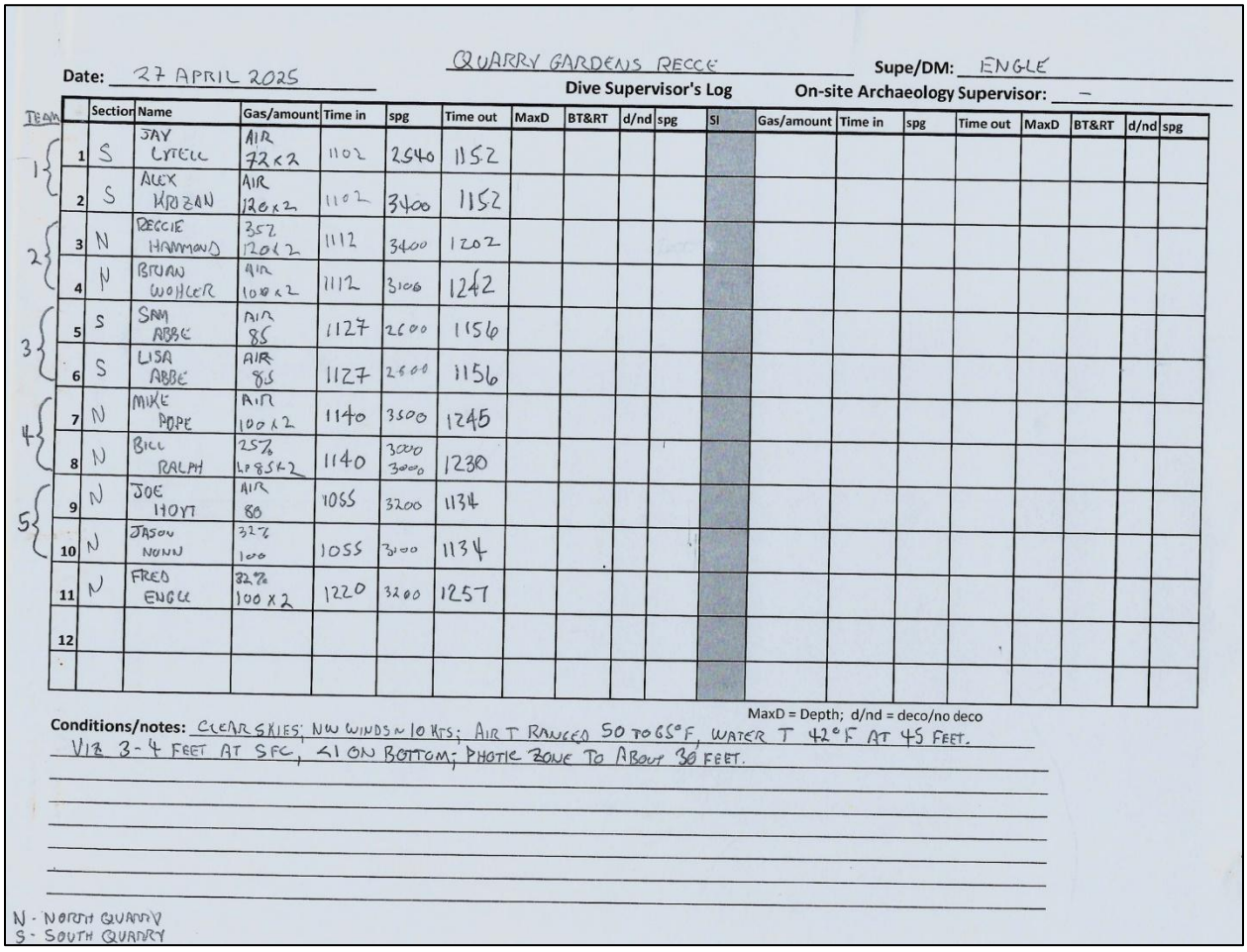
Flora/vegetation: *No grasses or other aquatic plant life observed underwater*
Fauna: *None observed*
Artifacts (to include trash (e.g., plastic jugs, refrigerator, tires)): *See below*

Brief description of dive:

Once clear of the tree branches, descended to the bottom. The thermocline was at 12 feet and the photic zone ended at 30 feet. After swimming at depth along the NW, N, and NE sides, keeping clear of the thick margin of branches, conducted a grid bottom search by compass. The bottom is a layer of plant detritus, primarily leaves and twigs that cover the rock bottom of the quarry. At least ten tires were lying on the bottom along the north side of the quarry along with plastic bottles, some intact and some in pieces. The bottom layer was probed at random points by hand to a depth of one foot, no contact was made with the rock bottom, the thickness of the plant detritus layer remains unknown. After the bottom search, the buttress on the east wall was examined. At 19 feet the buttress formed a sloping shelf that narrowed at 29 feet. At that point the buttress dropped almost vertically into the bottom detritus layer at 39 feet. A commercial-type refrigerator lies partially buried on the bottom just west of the buttress. No artefacts associated with quarrying were found on this dive.

Appendix C

Dive Supervisor's Log



Date: 27 APRIL 2025 — QUARRY GARDENS RECCE — Supe/DM: ENGLE

Dive Supervisor's Log — On-site Archaeology Supervisor: —

TEAM		Section	Name	Gas/amount	Time in	spg	Time out	MaxD	BT&RT	d/nd	spg	SI	Gas/amount	Time in	spg	Time out	MaxD	BT&RT	d/nd	spg
1	1	S	JAY CYTELL	AIR 72x2	1102	2540	1152													
	2	S	ALEX KROZAN	AIR 120x2	1102	3400	1152													
2	3	N	REGGIE HAMMOND	35% 120x2	1112	3400	1202													
	4	N	BRIAN WOHLER	AIR 100x2	1112	3100	1242													
3	5	S	SAM ABBE	AIR 85	1127	2600	1156													
	6	S	LISA ABBE	AIR 85	1127	2600	1156													
4	7	N	MIKE POPE	AIR 100x2	1140	3500	1245													
	8	N	BILL RALPH	25% LP85+2	1140	3000 3000	1230													
5	9	N	JOE HOYT	AIR 80	1055	3200	1134													
	10	N	JASON NUNN	32% 100	1055	3100	1134													
	11	N	FRED ENGLE	32% 100x2	1220	3200	1257													
	12																			

MaxD = Depth; d/nd = deco/no deco

Conditions/notes: CLEAR SKIES; NW WINDS N 10 KTS; AIR T RANGED 50 TO 65°F, WATER T 42°F AT 45 FEET. VIS 3-4 FEET AT SFC, <1 ON BOTTOM; PHOTIC ZONE TO ABOUT 30 FEET.

N - NORTH QUARRY
S - SOUTH QUARRY

Appendix D

DIVE PLAN 25 April 2025

BAREG Quarry Gardens Recce – 27 APR 2025

Location: The Quarry Gardens, 1643 Salem Rd, Schuyler, VA 22969

Purpose: Conduct a reconnaissance of the site's two quarries to determine if (1) there are significant mappable features for a future survey and (2) produce a mud map of the two quarries.

Site: The dive site has two quarries. The northern quarry's surface dimensions are approximately 300 x 150 feet and the southern quarry's surface dimensions are approximately 250 x 150 feet. Surface conditions include forested land cover and moderate terrain relief (Figure 2).

Environmental Conditions: Underwater conditions are UNK/TBD, but as this is a quarry and it will be one day after forecasted rain, we should expect turbid, low viz conditions. Water T is UNK. Underwater entanglement and entrapment hazards are also unknown, but no overhead conditions (adits) are expected given the nature of soapstone quarrying (Figure 1). Surface hazards include falls from steep quarry faces above the water, and ticks and tick-borne disease (e.g., Lyme Disease). The NWS forecast calls for clear conditions with air T in the low to mid 70s with light NW winds.

Sked:
0900 – Showtime, intros with Quarry Gardens staff
0915-1000 – Ground orientation of site, identify entry points and best routes for staging gear
1000-1030 – Divers gear up
1030 – Commence dive ops
1330 – Secure dive ops
1400 – Debrief with Quarry Gardens staff
1430 - Depart

Dive Roster:

Team 1
Alex Krizan
Jay Lytell

Team 2
Reggie Hammond
Brian Wohler

Team 3
Sam Abbe
Lisa Abbe

Team 4
Mike Pope
Bill Ralph

Team 5
Joe Hoyt
Jason Nunn

Dive Supervisor:
Fred Engle, cell 703-627-8868

BAREG LNO w/ Quarry Gardens:
Bill Chadwell

Tasking:

1. Obtain the bottom outside dimensions of the quarries (X,Y) and identify any significant relief changes (Z) within the bounds of the bottom dimensions.
2. Detect and identify any significant cultural features in the quarries. The historic photo of the quarry (Figure 1) reveals five or six small carts with booms riding on relocatable rail tracks. These features should be indicated on the mud map with dimensions.
3. Compile information from dive teams into one mud map (post dive).

Schuyler, Special Collections, University of Virginia Library, Charlottesville, Va.
http://search.lib.virginia.edu/catalog/uva-lib:1043782

Figure 1. Historic photo of one of the Quarry Garden quarries.

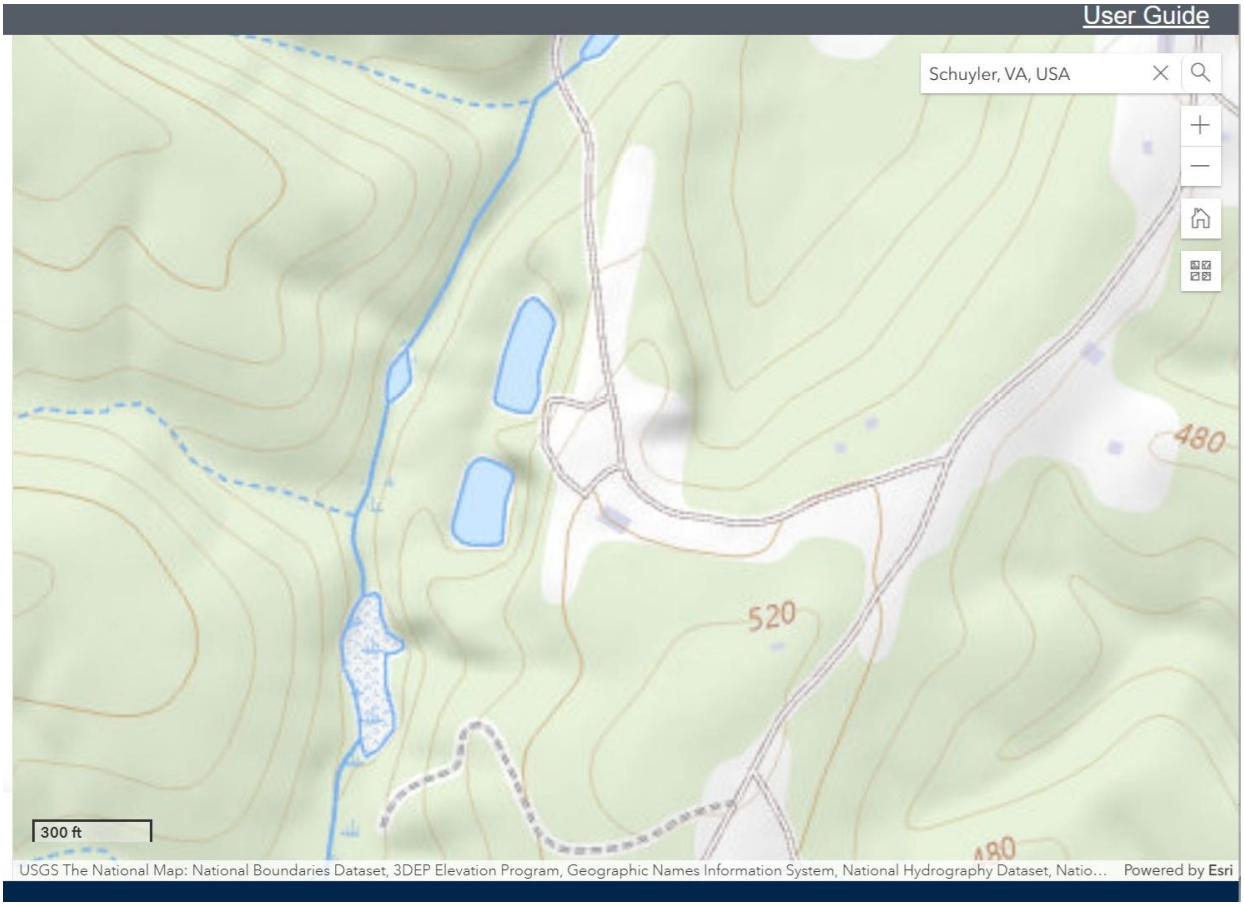


Figure 2. Extract from USGS topo map showing the Quarry Garden quarries.

Emergency Action Plan (EAP)

BAREG will have O2 and a dive first aid kit on site.

In the event of an injury requiring EMS:

Call 911

Nelson County EMS is responsible for emergency care and transport for incidents in Schuyler, VA. Based on discussion with Nelson County EMS, it's estimated that it will take 25 minutes for an ambulance to reach the dive site. If required, there is a designated helo LZ about five minutes from Quarry Gardens. UVA in Charlottesville is the nearest hospital and it does have a chamber, That said, we are required to coordinate chamber treatment through DAN.