**Town of Knox Conservation Advisory Council Meeting Notes 7:30 PM July 21, 2022**

Attending: Eric Marczak, Nelson Kent, Brigitte McAuliffe, Amy Pokorny and Peter Farquharson. Shawn McAuliffe did not attend due to a work schedule conflict.

Housekeeping

* Draft notes from the meetings of March 19 and April 21, as well as for May 19 will be considered for approval at the August 18 meeting.
* Brigitte said Shawn is offering to resign because of work schedule conflicts.
* Peter is interested in consideration for CAC membership.

Education and Outreach

Thom Engel spoke to the CAC. He is Vice President of the Northeastern Cave Conservancy (NCC).

* NCC owns Knox Cave and Ella Armstrong Cave, which has a vertical drop entrance across the road from Knox Cave. Crossbones Cave is on the same property as Knox Cave.
* Skull Cave entrance is on the Busch property near Knox Cave. It is about 4+ miles long, not fully mapped. It has a relief flow area where a person can sit up.
	+ Some of this cave is maze formations.
* The largest cave in Knox is the Knox-Fossil-Becker’s Cave, with an entrance near the junction of Knox Gallupville Road and Becker Road, is a maze cave.
* Tenant Farm Cave has a spring on the Mary Browne property on Pleasant Valley Road that sinks into a tunnel cave.
	+ Some of its water goes to surface drainage.
	+ Some goes into Berne.
* Pitcher Farm Spring – (southwest of Thompson’s Lake, between Thompson’s Lake and Warner’s Lake):  water comes from Thompson’s Lake.
	+ Thompson’s Lake is mostly on Esopus shale.
	+ At the southeast end, the limestone only extends 3 to 4 feet below the surface of the lake.
	+ Only at the southwest end of the lake does the limestone extend well below the lake surface.
* Mark Callahan and the McAuliffes have karst on their properties on Berne Altamont Road. Springs from behind McAuliffe’s (above the Highlands Restaurant) feed the Altamont Reservoir.
	+ Downpours from hurricanes Floyd, Irene, Lee channeled water and overflowed along these passages.
	+ Limestones act as a single unit. Knox Bedrock Stratigraphy:
		- Middle Devonian:
			* Helderberg Group
			* Onondaga Limestone– visible on Pleasant Valley Road
		- Lower Devonian:
			* Schoharie Limestone & Sandstone
			* Esopus Shales
			* Oriskany Shales
			* Becraft Limestone– visible in the Knox hamlet and town park
			* New Scotland Limestone– shaley limestone
			* Kalkberg Limestone
			* Coemans Limestone
			* Manlius Limestone
			* Rondout Dolostone
		- Upper Silurian
* Nelson’s house on Old Stage Road across from Carrick Road is on Becraft limestone.
* Lidar images can help identify sink holes, but resolution is at about 1 meter (6’ = 4 square pixels) if the location of limestone is known. It is used to construct false images from data from laser beam longest return measures.
	+ NYS GIS Clearinghouse <https://gis.ny.gov/> is a resource for maps
* Gun range near Thacher Park off Beaver Dam Road has dense brush – lidar identified a sink in that area.
* **Characteristics of karst geology in Knox**: sinkholes, caves, sinking streams
	+ Water moves by gravity, eroding passages in limestone.
	+ These caves and passages act as natural pipes and do not filter underground water.
		- Caves are found in the lower Helderberg (Rondout/Manlius/Kalkberg), in the Becraft, and in the Onondaga. The New Scotland and the top of the Kalkberg are shaly or impure and do not form caves.
	+ Karst aquafers are vulnerable to contamination.
	+ Glacier in this area filled in some cave entrances, and water rises up through glacial fill.
		- Maze development is caused by backflooding.
	+ Water sinks behind Van Etten Farm on Berne Altamont Road.
	+ Sinkholes in this area usually don’t open rapidly (as in Florida).
	+ Endangered species inhabit some local karst/caves, including the Northern long-eared bat.
* Wells in Knox: Almost every water source in Knox is unique. We have no municipal water source.
	+ Effects of hydrofracking water wells
		- Low pressure hydrofracking is usually done in shale and is less likely to affect neighboring wells.
		- Many wells in this area go below the limestone formations (+/- 400’ deep).
		- Wells with infeeders through limestone in the top 100’ should have casing to reach below the limestone to protect from contamination.
			* A lot of limestone is above (north of) Pleasant Valley Road.
			* The area near and north of Route 146 is below limestone.
				+ Wells in the Schenectady formation have sulfur water.
		- Use of dynamite in wells now requires advance notice to landowners within one mile.
			* Standards are needed.
				+ Develop proposal for change to zoning ordinance to require approval by \_\_\_?

Refer to protocol for development at archaeological sites.

* + - * + Propose limits to blasting near caves (but we don’t know where all of them are)

Cave locations need to be confidential to protect water sources.

Is CAC information about local cave locations subject to FOIL requests? Eric will check.

CAC could refer questions about prospective development activity in vulnerable areas to Thom/NCC for review.

Thom Engel provided a power point presentation about the different limestone units and surface drainages.

Thom gave Peter information about where the most vulnerable limestone areas are in Knox.

* + - * + Propose limits to blasting based on proximity to gas lines.

Refer to NOVA special about rebuilding the longest covered bridge in the world after the gas line explosion in North Blenheim.

* + - Contaminated wells can produce milky, “roily” water.
	+ Collecting water samples from local caves
		- Knox Cave has only one pool of water. We could request a permit to take a water sample from the cave manager.
		- We could sample water from both ends of the flow through the town park wetlands, source of the Foxenkill Creek.
	+ Maps of underground water flows in Knox
		- The bedrock slopes to the south (“dip”) which controls most water flow.
		- Water comes up and down from the north to the south at Fish Pool in Knox cave.
			* Scallop formations show the direction of the flow of water.
			* With velocity changes, sometimes water flows vertically (artesian wells)
* Geology of the Berne Quadrangle by Winifred Goldring was published in 1935 before plate tectonics were theorized and is no longer considered accurate. It also does not account for glacial features.
	+ <http://www.nysm.nysed.gov/staff-publications/geology-berne-quadrangle>
	+ In 2010 Thom re-mapped the geology of this area with updated information for the NYS Museum.
	+ Changes Thom has observed over time (not addressed)

Project ideas

* **Prepare an Open Space Inventory** (of both public and privately owned land)
* **Restore the wetlands boardwalk** forsafe access
	+ Eric suggested the Street Road parking area for the town park could also be used for access to the boardwalk if a trail from there to the boardwalk were developed parallel to the road.
		- * Consider also making it wheelchair accessible. We’ll need to get ADA rules.
		- Amy will ask Brian Wilson about prices for shale.
		- We will keep Councilman Dennis Cyr updated on our thoughts about repairs to the boardwalk.
		- We need to develop a proposal for boardwalk restoration, access improvement, trail building to request funding support (American Rescue Plan money?) from the town board.
			* Objectives include mitigating hazards/public safety concerns
			* Get application paperwork and requirements for development in wetland areas
			* Peter is gathering information to update the kiosk
		- Local naturalist Alvin Bresich is a founder of Helderberg Workshop. Eric will invite him to speak with us.
		- We need to learn about the sedges in the town park wetlands.
* Study the prevalence of **toxins in Knox**
	+ Local use of road salt and its effects
		- Amy reported that Highway Superintendent Matt Schanz said that at $50/ton, salt is one of his most costly budget items and he would like to reduce that expense. He expects it to go up to $80/ton.
		- They use pure salt on “hard top” surfaces such as the parking areas at town hall. They use a mix of salt and sand for other road surfaces.
		- They use 200-300 tons of salt per year.

Other Discussion

* Eric volunteered to help at the Household Hazardous Waste Collection Day on Saturday, July 23 from 9 AM – 2 PM at the Knox highway garage.
	+ We could put a pesticide pledge in the next newsletter.
* Amy will ask if CAC members can subscribe to the Towns & Topics magazine put out by the NYS Association of Towns.
* Yngvar W. Isachsen wrote Origin of Anorthosite and Related Rocks as a geologist for the NYS Museum.

The meeting adjourned after 9 PM

Post-CAC meeting clarification of timeframes per [www.factmonster.com](http://www.factmonster.com)

* Cenozoic Era (“Recent Life”)
	+ Quarternary period (1.64 million years ago – present day)
	+ Tertiary period (65 – 1.64 million years ago)
* Mesozoic Era (“Middle Life”)
	+ Cretacious period (145 – 65 million years ago)
	+ Jurassic period (200 – 145 million years ago)
	+ Triassic period (250 - 200 million years ago)
	+ Permian period (290 – 250 million years ago)
	+ Carboniferous period (355 – 290 million years ago)
	+ Devonian period (415 – 355 million years ago
		- Middle
			* 15 Hamilton shales and flags
			* 14 Marcellus Formation
			* 13 Onondaga Limestone
		- Lower
			* 12 Schoharie Formation
			* 11 Esopus Shale
			* 10 Oriskany Sandstone
			* 9 Becraft Limestone
			* 8 New Scotland Formation
			* 7 Kalkberg Formation
			* 6 Coeymans Limestone
			* 5 Manlius Limestone
	+ Silurian (445 - 415 million years ago, third period of the Paleozoic Era)
		- Upper
			* 4 Rondout Waterlime (no fossils)
			* 3 Brayman Shale (no fossils, considered by some a residual soil at top of Ordovisian)
	+ Ordovician (490 - 445 million years ago)
		- Upper
			* 2 Indian Ladder beds
		- Middle
			* 1 Schenectady Formation

Paleozoic Era (“Ancient Life”)

* + Cambrian period (545 – 490 million years ago)

Precambrian (4,600 – 545 million years ago)