

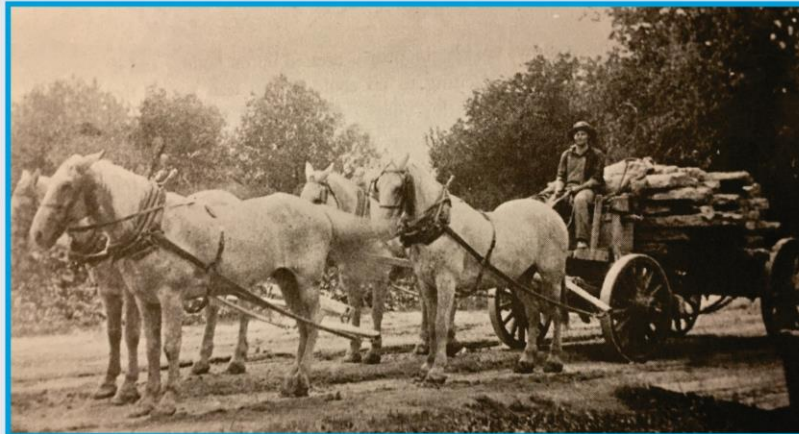


North River Bluestone in Hidden Quarry

***Historic Hemlock Quarry District:
Archaeologic & Geologic Resources in
Bluestone Wild Forest (circa 1830 - 1905);
Ulster County, New York June 14, 2021***



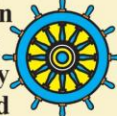


Waughkonk Wagon Road



Teamster with wagon load of bluestone en route to Fitch Brothers dock at Wilbur some 7 miles to the southeast




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Historic Hemlock Quarry District

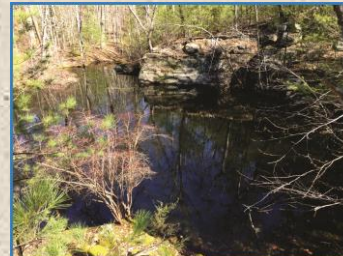
Eligibility Statement

The bluestone quarry industry was instrumental in shaping our industrial heritage and in providing solid work for immigrants. Together, historic wagon roads, quarries, workshop areas, foundations, stone-walled pastures, an abandoned railroad station, and unique geologic features combine to portray an important early 19th and 20th century landscape. The:

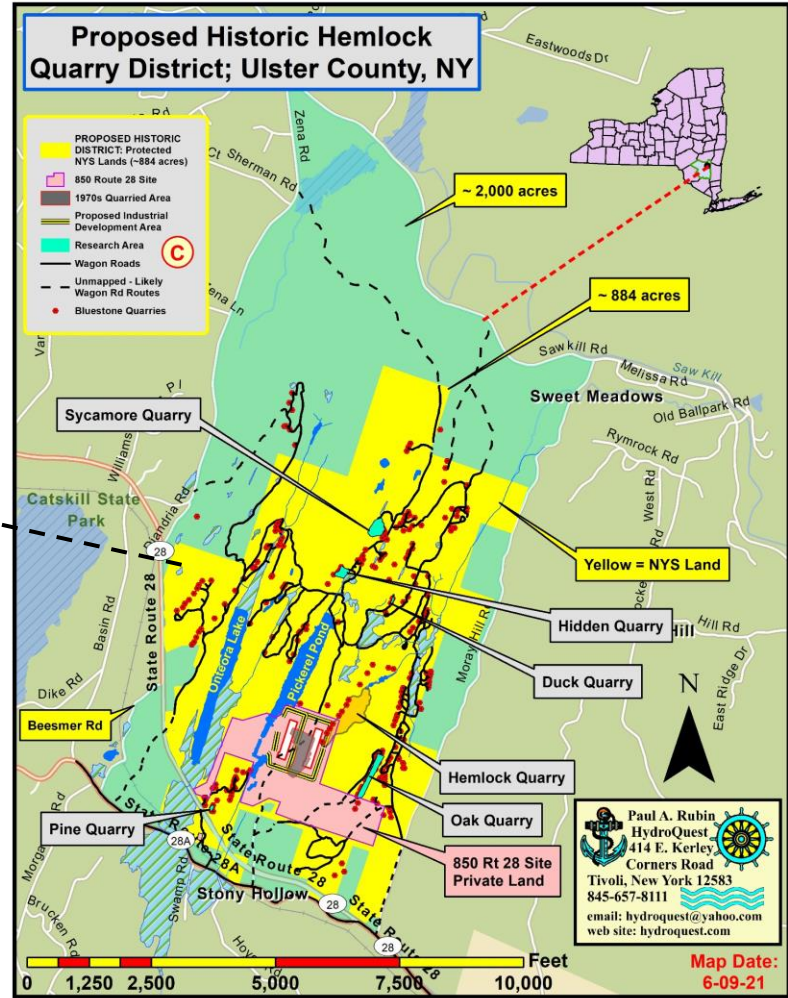
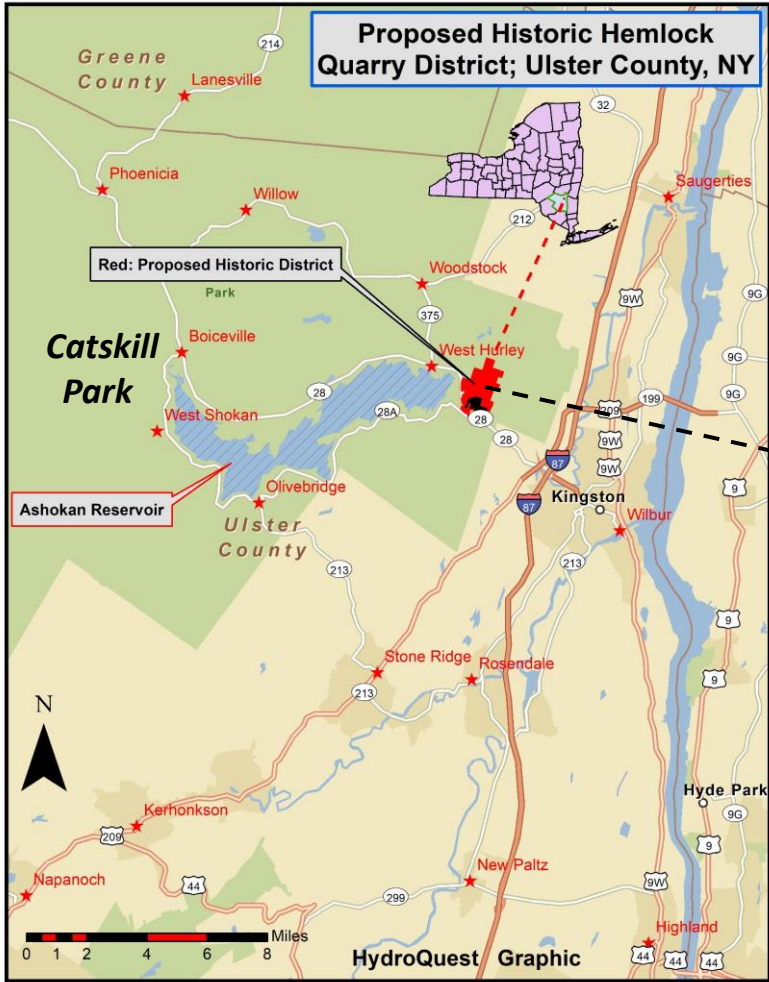
“Office of Parks, Recreation and Historic Preservation (OPRHP) has determined that the Hemlock Historic Bluestone Quarry District (aka Historic Hemlock Quarry District) is eligible for the New York State and National Registers of Historic Places (11106.000034).”

At a minimum, it is eligible for listing under Criteria A (Patterns of History), C (Design/Construction), and D (Information Potential) for its potential to inform our understanding of historic bluestone quarrying methods and the organizational principals that characterized this industrial district. Listing will recognize, preserve, and protect exemplary archaeological and geological resources.

Recent investigation within Bluestone Wild Forest has found and documented dozens of bluestone quarries interconnected by a network of engineered wagon roads - all within an 884-acre area. Other features connected by these wagon roads include building foundations at quarries and of a former railroad station, stone-walled farm fields, and a bluestone house. They indicate interrelated day to day life activities and early industrial operations, possibly under the guidance of a single quarry master or land lessee. Cultural features reflect a time capsule of pre-Civil War industrial quarrying methods.



Location of Proposed Historic Hemlock Quarry District (all on NYS-owned land)



Common Bluestone Uses

Bluestone (aka sandstone) was highly prized for many purposes. Some of them included use as flagstones, street crossings and house trimmings, millstones, curb stones, platforms, window and door sills, lintels, walls, steps, foundations, and building stone.



Former home of Irish immigrant Patrick H. Urell who, in 1865, lived there with his wife Marcella Fallon, five children and mother Ellen. By 1875, ten children lived in this bluestone home along Waughkonk Road. (Google photo)



Former Fitch Brothers office in Wilbur.



Bluestone Sources: Cliff Quarries

Quarry Types: Geologic assessment of quarries in Bluestone Wild Forest reveals four distinct types ranging from most to least productive. Foremost are long cliff quarries ranging from those with sandstone from the ground surface downward to those with a thick crumbly shale overburden “top” requiring removal prior to reaching marketable underlying sandstone beds. Two of the very best examples of no overburden vs. shale overburden are found in the Hemlock (below) and Oak (photos to right) cliff quarries, respectively.

Scale: 7.5 inch field notebook

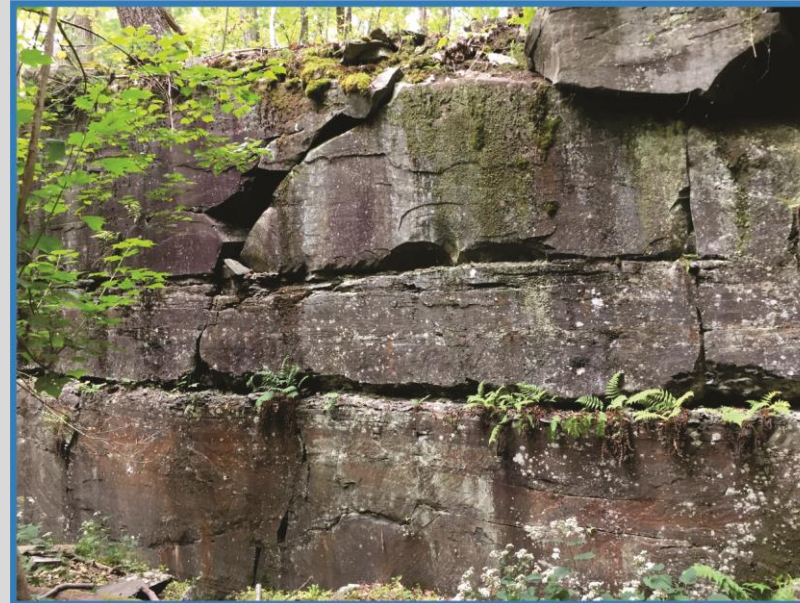
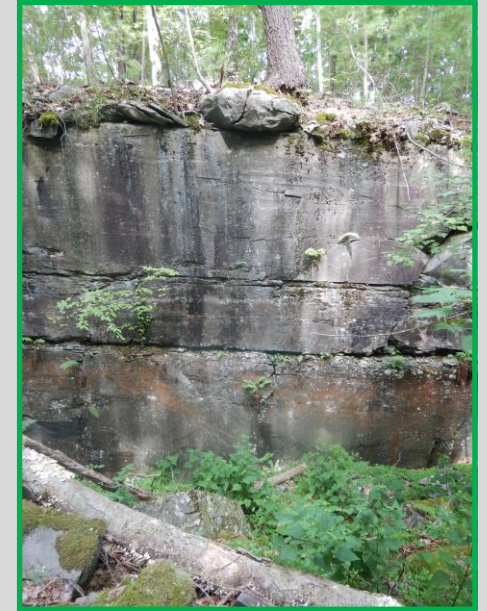


“If the stoneyard owners were at the top of the bluestone pyramid, the men who took the stone from the quarries were obviously at the bottom. Theirs was not an easy or a safe job. Broken limbs, smashed hands, blindness, dust-caused lung disease, and other calamities were frequent.” Alf Ever (Catskill Historian, 1972)



Hidden Quarry – A Cliff Quarry with thick bedding and wide joint spacing

Located along the historic Waughkonk Wagon Road deep within Bluestone Wild Forest. Likely source quarry for massive flagstone blocks known as “platforms”, “flags” or big stones.



Trench & Wildcat Quarries. Bluestone was extracted from long and short trenches. Pine Quarry (below) exhibits working faces as they appeared the day quarry workers left. Small test trench quarries scattered throughout the forest are referred to as “wildcat quarries” as they were exploratory in nature and are generally located close to wagon roads.



Pit Quarries

In the gradation of quarry types, pit quarries are either deepened cliff or trench quarries that are now flooded. While some engineering efforts were made to reduce water inflow during operation (i.e., dam construction), it is likely that periodic pumping was needed. Over time, nature has taken over and they have become excellent wildlife habitats.



Knolls, Kettles and Boulder Quarrying

Knolls (isolated hills) and kettles (depressions) are features that form as a glacier stagnates and melts, resulting in a hilly or hummocky landscape. Some of the many knolls in the Bluestone Wild Forest are littered with jumbles of large boulders that accumulated below open shafts in the glacier surface (moulines) or at the base of a melting glacier front. Quarry workers would sometimes exploit boulders exposed on knolls or excavate them to expose boulders. This was not time well spent.



Rounded knolls surrounding kettle pond.



Bouldery knoll with worked boulder on top. Height: approximately 40 feet.



Bouldery knoll top.



Turtle Kettle Pond.



Excavated knolls showing internal boulders & bedding planes exploited for flagstones.





Relict Quarry Items



- Wagon wheel hub and hub bands;
- Cut flagstones;
- Pry bar.



Native Americans and Waughkonk Road

Waughkonk Road (aka Waghkonk Road) may have been used by Native Americans for thousands of years prior to being upgraded for bluestone laden wagons. Catskill Historian Evers (1972) states: *“Some Indians who lived on the fertile plains near Kingston made their way to Woodstock over a trail which followed the route now known as the Waghkonk Road, past a spot still called the Indian Spring, and then joined the Sawkill trail.”*

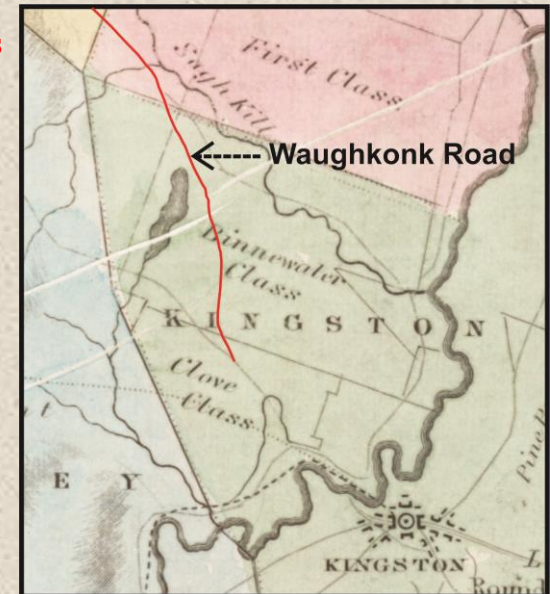


Waughkonk Wagon Road: Gateway to the Past

Waughkonk Road was a major woods road used by travelers, bluestone quarry workers and, reportedly, by Native Americans. With the exception of a small portion that was quarried away in the 1970s most of its 4.2 miles remain intact today, in its historic state, unpaved, silently snaking through Bluestone Wild Forest. Burr's rough 1829 map showed the general location of this road. In 1858, this map was replaced by an accurate directed survey by J.H. French. Historic bluestone quarries in Bluestone Wild Forest, dating back to about 190 years, were integrated via a tributary wagon road network. Until recently, 19th century bluestone quarries were viewed in isolation within the forest. However, all quarries were connected along a road network on which heavily laden horse drawn wagons transported stone to docks in Wilbur.

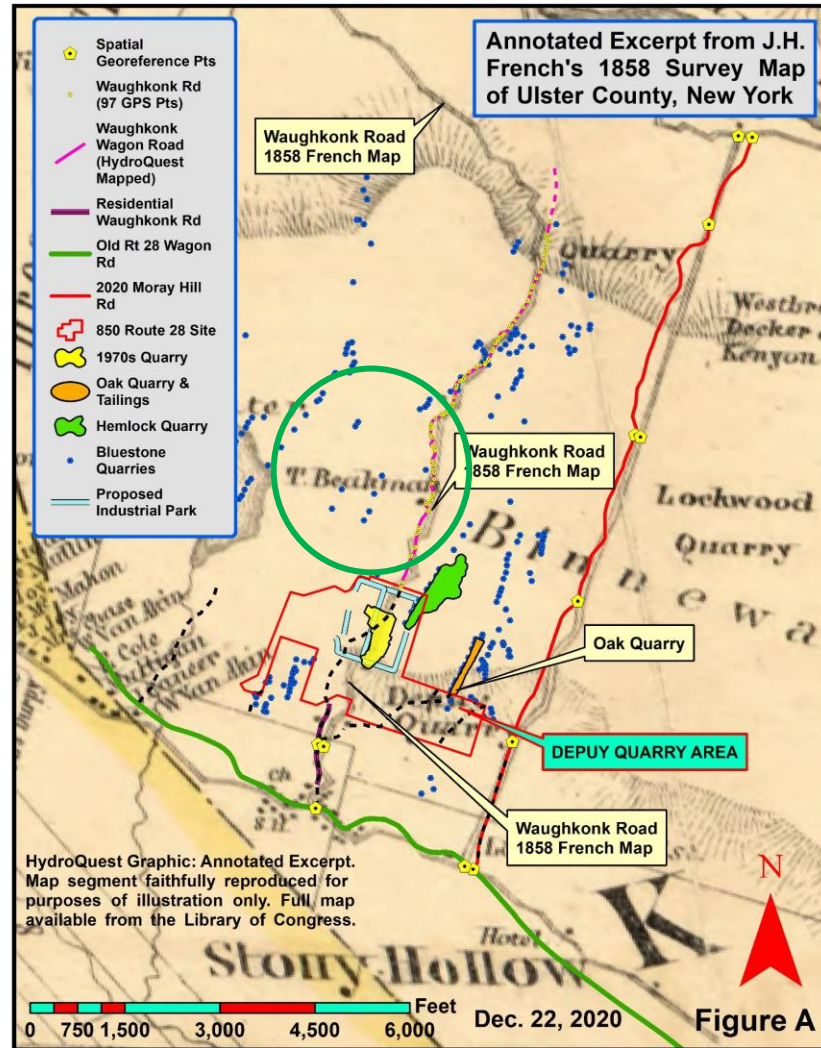


Metal rimmed wagon wheels wore grooves in roads still visible today, some deeply cut into bedrock (to 1.2 feet).



Segment of 1829 David H. Burr Map of the County of Ulster

1858 J.H. French Survey Map



Waughkonk Road served as major wagon road that connected multiple bluestone quarry operations within Bluestone Wild Forest. J.H. French's directed survey of Waughkonk Road (to left) is excerpted from his 1858 Map of Ulster County, New York. This "actual survey" was a significant upgrade from the low quality 1829 Burr map and 1853 Brink and Tillson map. The 1875 Beers County Atlas map also shows this same road, much of it reproduced from French's 1858 survey map. The red dots on Figure A depict multiple road locations recorded by HydroQuest using a Global Positioning System (GPS) receiver with spatial georeferencing into the modern Universal Transverse Mercator (UTM) coordinate system. Note the "T. Beakman" label and black dot circled in green. This was an active farmstead site 163 years ago, prior to the Civil War.



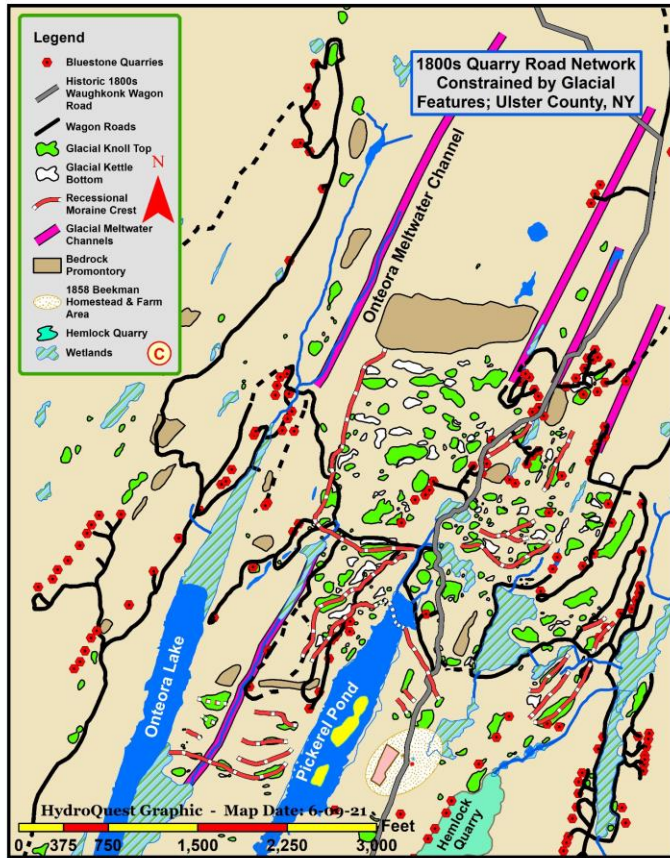
Identification of Historic Wagon Roads: Delineating Features

Heavy stone slabs extracted from Bluestone Wild Forest quarries required well constructed and maintained roadways for horse drawn wagons. Every significant bluestone quarry had a wagon roadway or tramway to connect it to well established roadways to deliver stone to market at the loading docks in Wilbur. Some of many delineating features include:

- Roadway proximity to major or minor quarry workings (leading to and from);
- Distinct, well-worn, roadways sometimes incised downward through soil to or into underlying bedrock;
- Distinct parallel wagon wheel ruts;
- Roadways constructed of quarry rubble;
- Clear, well-worn, roadway intersections (often angled indicating travel direction);
- Presence of old foundations proximal to wagon roadways;
- Roadbed is built above grade on one or both sides;
- Ramps constructed across low lying areas, between physically separated areas, and to quarry workings;
- Presence of shaped/worked flagstones discarded alongside wagon roads;
- Faint parallel grooves visible beneath leaf cover; and
- Physical location constrained by rugged topography, cliffs, or boulders to either side.

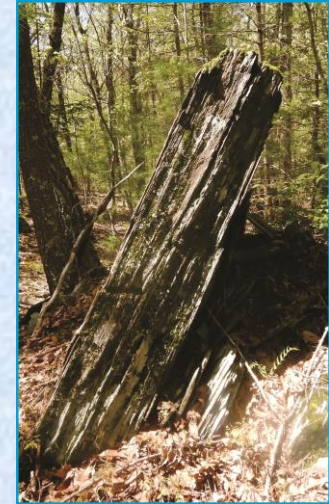


The Bluestone Wild Forest quarry road network weaves amidst numerous glacial features including:



20+ Miles of Historic Wagon Roads Mapped

- Sculpted bedrock cliffs and promontories;
- Elongate glacial meltwater channels;
- Glacially carved Onteora Lake;
- Glacially formed wetlands and kettle ponds;
- Bouldery and smooth moraine ridges;
- Bouldery and rounded knolls;
- Kettle depressions; and
- Drumlins and boulder trains.



1800s Wagon Road Engineering

Quarry workers went to great effort to engineer roadbeds suitable for heavy wagon traffic. A discerning eye will notice short and long road sections filled, graded, or entirely constructed with quarry rubble (to 250+ feet), ramps crossing low wetlands and graded to quarry exposures, notched hillslopes, and loops constructed to connect quarries and direct wagon flow. Engineered and well-integrated wagon roadways provide valuable insight into operation and likely oversight components of the bluestone industry in Bluestone Wild Forest - a quarry location close to a shipping port in Wilbur.



Engineered rubble roadbed.



Ramp across wetland at north end of Onteora Lake.



Ramp to connect quarry areas separated by a low cliff.



Roadway trenched through glacial knoll.



Roadway between laid rubble walls.

Recessional Moraines & Wagon Road Engineering

Bluestone Wild Forest contains a series of recessional moraines (i.e., geological features) that are only now being mapped and studied. Each moraine faithfully marks a temporary standstill of the receding glacier front. These and other undisturbed glacial landforms, all clustered within a geographically small area, are unique to the Catskill Mountains and, as such, provide an exceptional educational opportunity. Moraines are characterized by steep, often arcuate, ridges - many with boulder strewn tops and flanks. Boulders are commonly at steep to vertical angles that they landed at after sliding off sloping glacier fronts. Elongate troughs and wetlands are sometimes bounded behind moraines, relics of glacial retreat. Wagon road engineers crafted roadways to avoid and sometimes traverse along the tops of moraine ridges, as well as to skirt wetlands.



Archaeological Resources



- * Quarries;
- * Quarry Work Sites;
- * **Building Foundations;**
- * Wagon Road Engineering;
- * Stone-Walled Pastures;
- * Beekman Farmstead; and
- * Stony Hollow Railroad Station.



1858 Beekman Farm and Homestead

Bluestone Wild Forest supported more than bluestone quarrying. Research to date has revealed two stone-walled pasture areas along wagon roads. One, located along Waughkonk Road, is represented only by a black dot and the name T. Beekman on French's 1858 Survey map. Field reconnaissance revealed the presence of a 13-foot by 24-foot foundation with a 6-foot deep cellar, a possible barn foundation some 38 feet long, a 6+ foot deep stone-walled dug well, a wetland source for watering animals within 235 feet, and a 0.75-acre stone-walled pasture. Site flagstones provide evidence of Beekman's interaction with nearby bluestone quarries. Ongoing research may identify an ancestral link between T. Beekman and Hendrickus Beekman who executed a deed on August 6, 1705 with four Esopus Native Americans to large tracts of Woodstock area lands.



Inside dug well



Stovepipe relic



Beekman home foundation



Stone wall around pasture

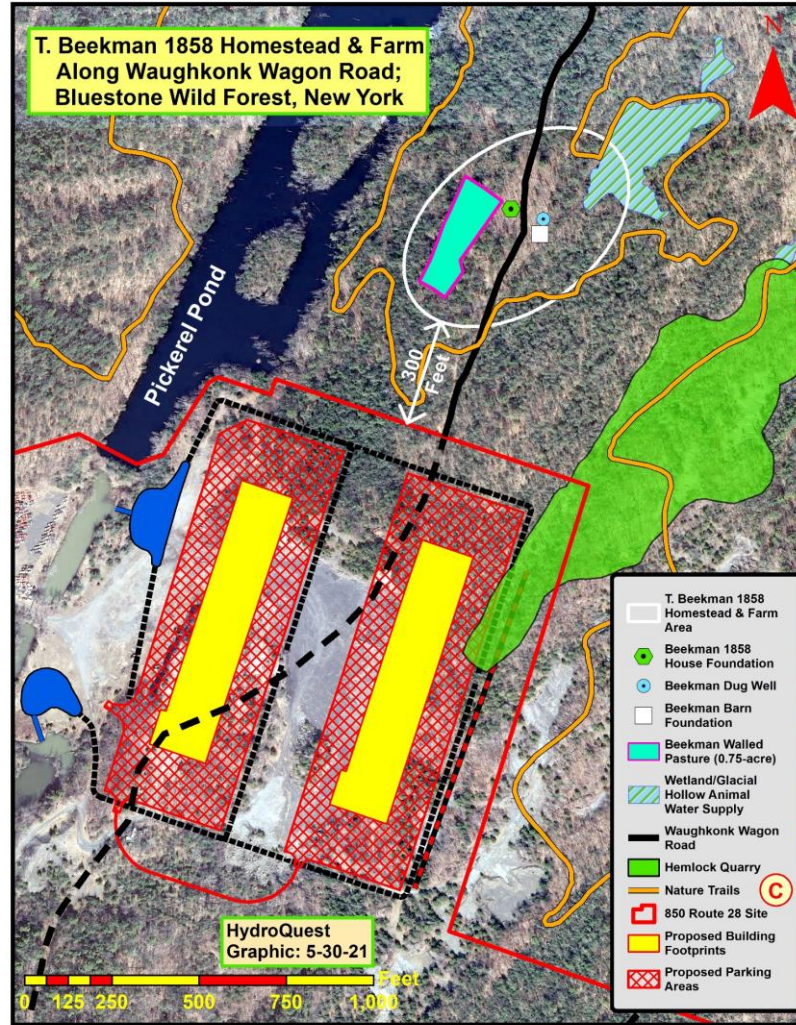
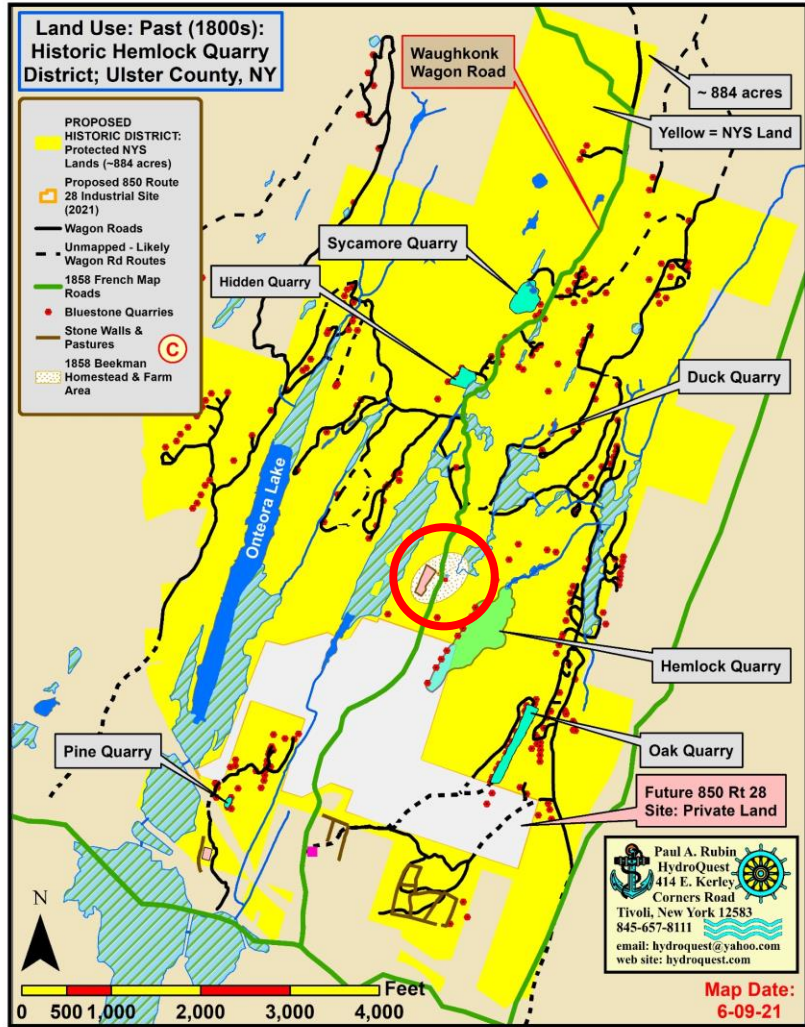


Wetland water source



Beekman flagstone

Location of 1858 Beekman Homestead & Farm



Stony Hollow Railroad Station

Foundations, stone walls, bricks and an area of large cut bluestone blocks within Bluestone Wild Forest belie the heyday of the Stony Hollow Railroad Station. At ~ Railroad MP 8.56 miles, this station served as a flag stop from 1868 until its closing in the 1920s along the Ulster & Delaware Railroad. Here, shaped bluestone blocks provide historic evidence that stone cutters used both rail and wagon to transport bluestone to market.



Stony Hollow Railroad Station: Shaped Bluestone Block Area

A western Bluestone Wild Forest wagon road traverses from relatively small bluestone quarry workings, including Pine Quarry, both directly to the Stony Hollow Railroad Station and to the main wagon road taken to the Wilbur docks. An area of large cut blocks adjacent to the largest foundation area provides room for speculation. Imperfections in some blocks may imply nothing more than additional shaping was planned at the Wilbur docks or, perhaps these were for tourist demonstrations, or maybe they mark the closing day of Pine Quarry.



Yellow Field Notebook: 7.5 inches high



Pastures and Crop Lands in Bluestone Wild Forest

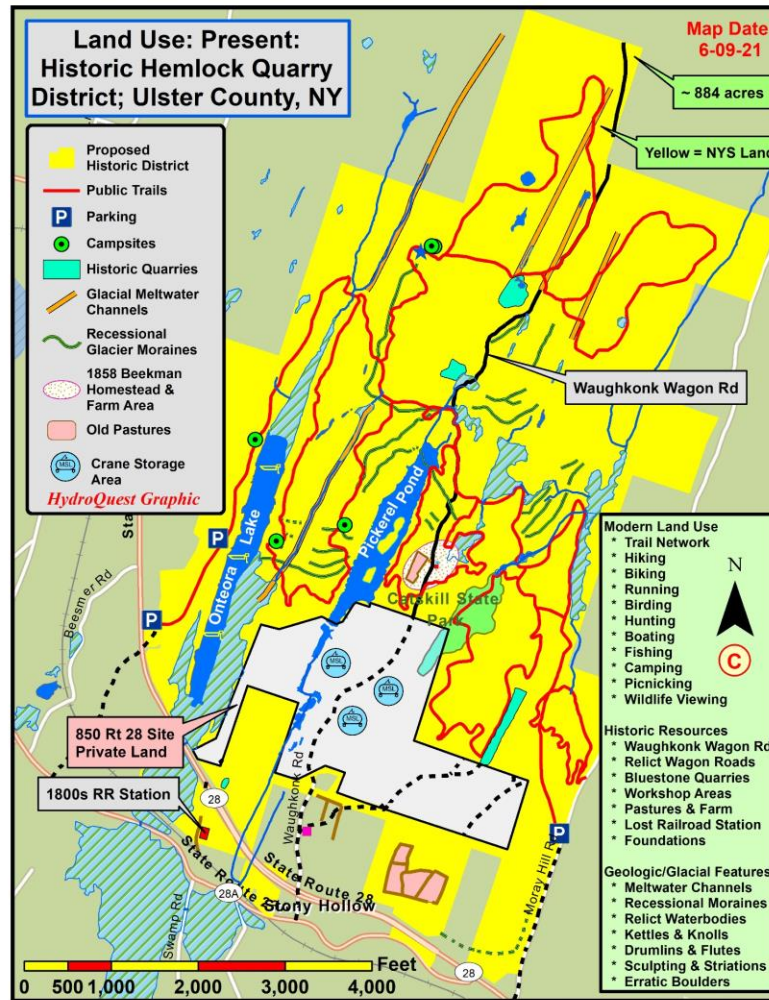
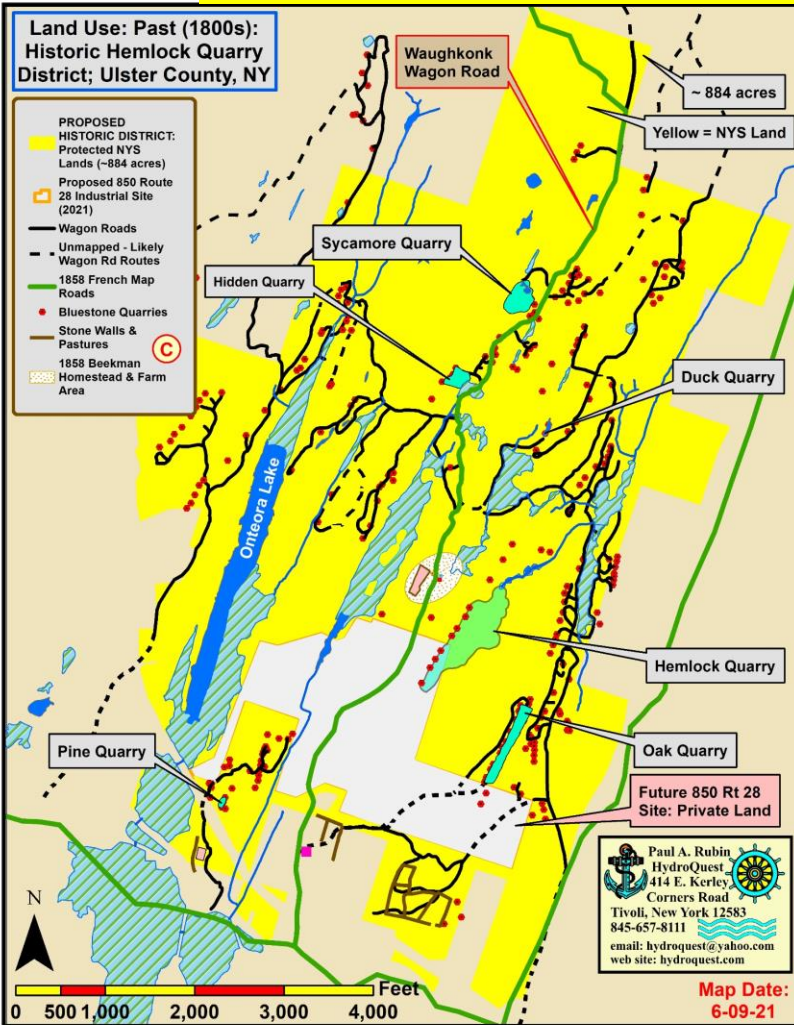
Bluestone Wild Forest supported more than bluestone quarrying. Four pasture areas have been mapped in the southeastern portion of the forest, totaling approximately 5.8 acres in areal extent. They have been extensively cleared of stones and had a number of possible uses, including grazing for sheep or young dairy or beef cattle, possibly overnight grazing of quarry horses, or cultivation of small grains or hay. There are constructed openings in the pasture walls that allowed passage of horse drawn wagons. They are aligned with relict wagon roads, thus documenting and correlating concurrent pasture and/or farming use and bluestone quarry industry use. Wagon roads link the pastures with the 1800s Urell stone house and Fitch frame house along Waughkonk Road.



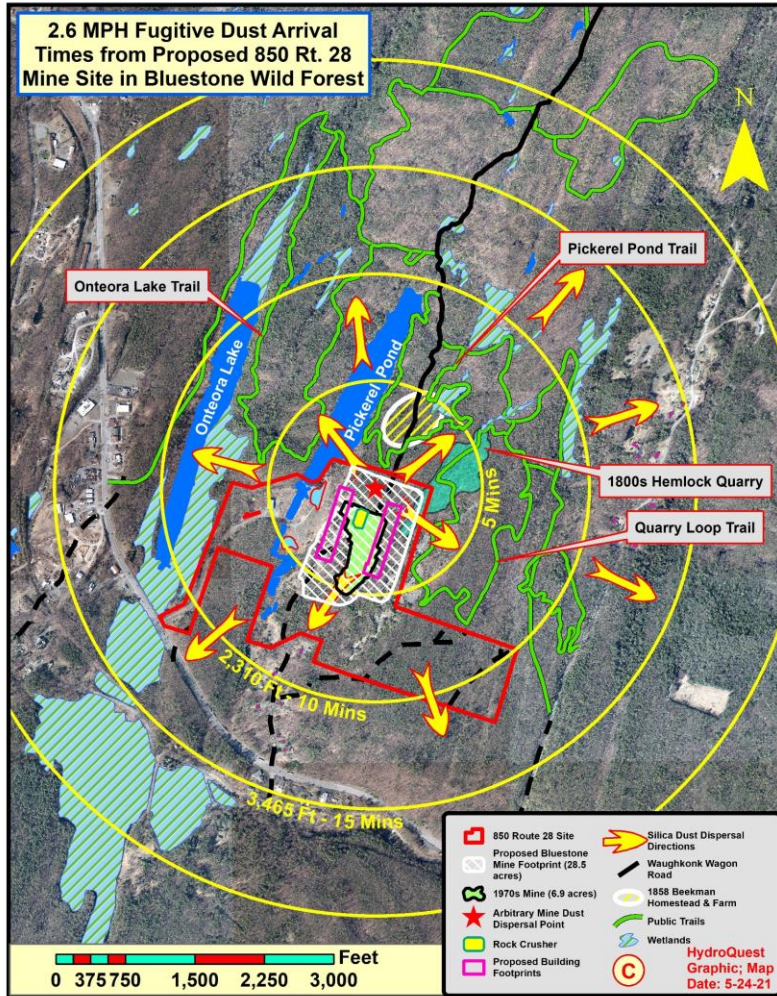
Factors that make the rich cultural history preserved in the Bluestone Wild Forest unique?

- * **Significant features present within Bluestone Wild Forest reveal a comprehensive, integrated, picture of early United States industrialization set within a framework of everyday life of the 1800s that is not documented elsewhere;**
- * **Dozens of bluestone quarries are preserved in a relatively small physical area within 7 miles of shipping docks (vs. single small and larger isolated quarry operations elsewhere);**
- * **The density and size of Bluestone Wild Forest quarry works necessitated a large work force, including Irish immigrants documented in nearby Stony Hollow (demand, source material, labor force, nearby market);**
- * **Quarry types and operations in the forest were varied and, thus, provide a forum for interpretation of extraction methods on geologically varied bedrock;**
- * **Stone foundations in quarry areas await archaeological investigation and will add to our understanding of this integrated quarry operation;**
- * **Waughkonk and other wagon roads provided a forest roadway network that interconnected a few 1800s homes, pastures, a plateau top farmstead, and a now defunct railroad station - providing a broad historic picture of everyday life within Bluestone Wild Forest;**
- * **A wagon road, foundations, and drilled quarry stones at remnants of the 1868 Stony Hollow railroad station belie quarry stone transport by both rail and wagon;**
- * **Much of the unpaved historic Waughkonk Road remains intact today, much as it was hundreds of years ago (like stepping back in history). This road was a major woods road used by travelers, bluestone quarry workers and, reportedly, by Native Americans. It forms the wheel hub from which other spokes (aka wagon roads) led to numerous quarries. It is a gateway to the past;**
- * **Over 20 miles of well-engineered wagon roads connect dozens of quarries nestled within a complex glacial setting;**
- * **Engineered and well-integrated wagon roadways provide valuable insight into operation and likely oversight components of the bluestone industry;**
- * **Minimal disturbance has occurred within the forest since quarry workers left - leaving miles of wagon roads preserved intact as they were left over a century ago;**
- * **Thomas Beekman, who operated a farmstead within Bluestone Wild Forest 163⁺ years ago, may be a descendant of Hendrickus Beekman who executed a deed on August 6, 1705 with four Esopus Native Americans to large tracts of Woodstock area lands;**
- * **Much of the integrated wagon road-quarry network is protected by NYS forest land;**
- * **Cultural interpretation of features preserved in the Bluestone Wild Forest will make a significant contribution to the broad patterns of our history; and**
- * **Study, preservation and protection of these rich historic/cultural resources, with emphasis on all its integrated components (quarries, wagon roads, foundations, relict railroad station, stone-walled pastures, Beekman farmstead, glacial features) will yield important information on infrastructure and operations that were instrumental in shaping the early industrial framework of the United States. **Now, a look to the past, present, and possible future:****

Bluestone Wild Forest: Past and Present Land Use



Potential Nearby Future Land Use



Operators of the 850 Route 28 parcel identified by a red polygon to the left seek approval for a manufacturing/industrial facility with two large buildings (each 120,000 ft² and 800 feet long). Proposed construction preparation would entail open-pit bluestone mining for two to three years with drilling, blasting, stone crushing and washing, bulldozing, truck loading, noise, and dispersal of fugitive dust to numerous recreational areas within State owned Bluestone Wild Forest. The applicant seeks exemption from a standard DEC Mined Land Reclamation Permit under a construction exemption despite their planned removal and marketing of 67-times the maximum annual quantity of minerals beyond which a mining permit is normally required. Bedrock mining would excavate 405,000 cubic yards of bluestone over 28.4 acres and would entail removal of about 8 percent of the tributary watershed that feeds the prized Pickerel Pond fishery and ecosystem, removal of about 50 percent of historic Hemlock Quarry and a portion of the Waughkonk Wagon Road. Industrial buildings would be within 370 feet and 200 feet, respectively of the Ontario Lake and Pickerel Pond trails.



Receptor Locations & Fugitive Silica Dust Arrival Times			
Location	Approx. Distance From Nearest Proposed Industrial Building (feet)	Approx. Distance From Proposed Mine Footprint (feet)	Approx. Fugitive Dust Arrival Time From Proposed Mine Boundary With 2.63 MPH Wind Speed (seconds)
Pickerel Pond Trail	200	120	31
Quarry Loop Trail	315	130	34
Ontoera Lake Trail	370	485	126
1858 Beekman Homestead Site	445	375	97
Pickerel Pond	90	55	14
Ontoera Lake	1485	1400	364
Ontoera Lake Picnic Area	1670	1790	465
Nearest Wetland	1050	820	213
Nearest Residence	1000	560	145



The non-renewable features presented in this Power Point presentation provide an exceptional cultural resource and opportunity to reconstruct and interpret historic stone quarrying methods (some of which cannot be gleaned from historic sources). They have great value as an archaeological resource and, importantly, for educational, historic, geologic, and ecotourism venues. Preservation of archaeological resources as an integral part of our national heritage is needed so they will be available for future study and analysis of the past as well as the future (New York Archaeological Council Standards Committee, 2000).

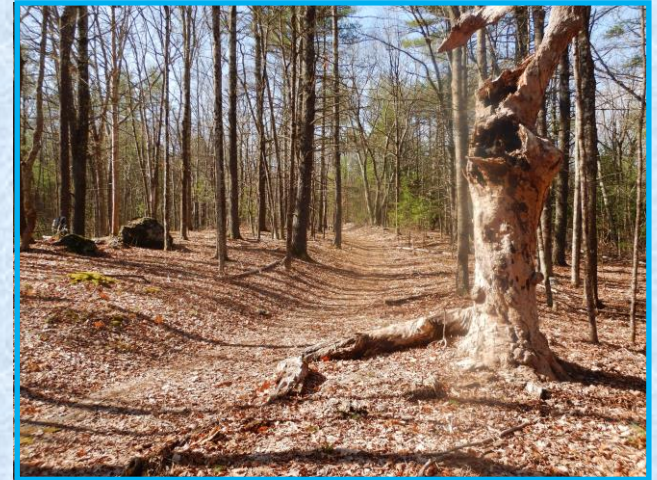


In keeping with National Register of Historic Places categories of historic properties, this “...district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.”



The undisturbed nature of these quarries, working areas, and wagon road network located within a unique glacial setting provides an outstanding opportunity for cultural archaeologists and geologists to study and interpret historic quarrying methods, historic quarry functioning infrastructure, and glacial features formed by advancing, stagnating, and retreating glaciers. In essence, Bluestone Wild Forest cultural features reflect a time capsule of pre-Civil War industrial quarrying methods. It is clear that the full context of the cultural resource must be viewed and preserved not solely on the basis of single quarries (e.g., Hemlock Quarry), but instead as one cohesive integrated network that with continued study will fill a chapter on the early bluestone industry of the United States.

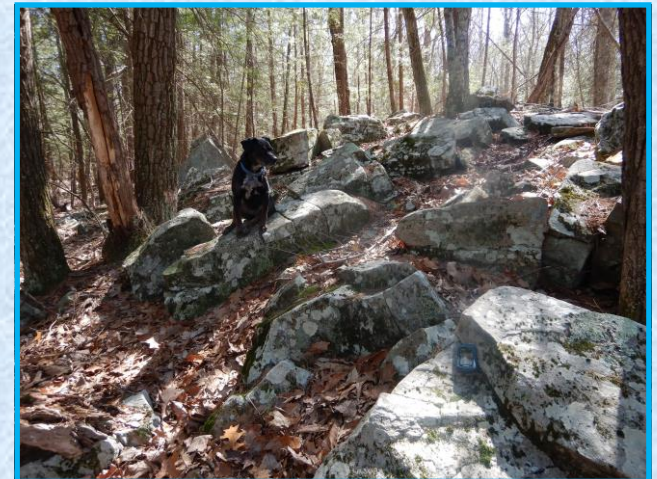




**Waughkonk Wagon Road:
Gateway To The Past**



**Rich In Archaeologic & Geologic
Resources: Research Is Ongoing**




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