Galasso Quarry Expansion
Concept Plan
East Granby, Connecticut

Eastern Connecticut
Environmental Review Team Report

Eastern Connecticut Resource Conservation & Development Area, Inc.

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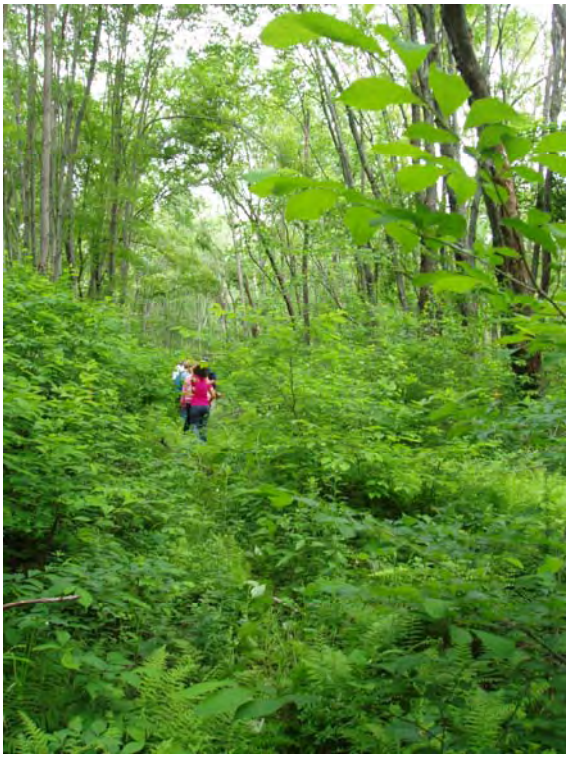

Environmental Review Team Report

Prepared by the
Eastern Connecticut
Environmental Review Team of the
Eastern Connecticut Resource Conservation and Development Area, Inc.

For the
Planning and Zoning Commission
East Granby, Connecticut

January 2013

Report #630

CT Environmental Review Teams
1066 Saybrook Road, PO Box 70, Haddam, CT 06438
860-345-3977

Acknowledgments

This report is an outgrowth of a request from the East Granby Planning and Zoning Commission to the North Central Conservation District (NCCD) and the Eastern Connecticut Resource Conservation and Development Area (RC&D) Council for their consideration and approval. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The Eastern Connecticut Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Monday, June 11, 2012.

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*Report not yet received.

I would also like to thank Gary Haynes, director of community development, Tim and Colin McAvoy, Galasso Materials, Kevin Johnson and Cory Garro, Close Jensen & Miller, and Mike Zizka and Kari Olson, Murtha Cullina LLP, for their cooperation and assistance during this environmental review.

Prior to the review days, each Team member received a summary of the proposed project with location and aerial photos. During the field reviews Team members received additional information, and a concept plan. Reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the Town and applicant. This report identifies the existing resource base and evaluates its significance to the proposed use, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The Eastern Connecticut RC&D Executive Council hopes you will find this report of value and assistance in reviewing the proposed plans for an expansion of the existing Galasso quarry

If you require additional information please contact:

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Introduction

Introduction

The East Granby Planning and Zoning Commission requested Environmental Review Team (ERT) assistance in reviewing a proposed concept plan for an expansion of the Galasso Quarry. The ERT conducted a study and a report was issued December 2004 for a previous expansion. The 2004 ERT report may be found on the ERT website at: http://www.ctert.org/ERTWebsite/pdfs/EastGranby_GalassoExpansion_588.pdf.

The Galasso Holdings property is over 500 acres in size with approximately 160 acres in active quarry. The current concept proposal is to expand the existing quarry by approximately 75 acres to the south of the existing quarry, to close to Hatchet Hill Road. The area was recently re-zoned for quarry use. The site is currently forested with mapped wetlands. The proposed quarry elevations will be 210 feet, which is approximately 30 to 50 feet above the water table.

Objectives of the ERT Study

The Planning and Zoning Commission requested a review of the proposed quarry expansion concept plan with regard to potential impacts on the site's natural and cultural resources. Major concerns include: significant narrowing of the ridgeline, ensuring proper drainage, potential impacts to wetlands, impacts to Metacomet Trail, tree clearing reducing the core forest area, potential impacts to Natural Diversity Data Base species and DEEP Natural Biodiversity Area, discussion/distinction between restoration and re-use plan, and potential impacts to cultural resources.

The ERT Process

Through the efforts of the East Granby Planning and Zoning Commission this environmental review and report was prepared for the Town of East Granby.

This report provides an information base and a series of recommendations and guidelines which cover some of the issues of concern to the town. Team members were able to review maps, and a concept plan provided by the town and the applicant.

The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted Monday, June 11, 2012. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

Location and Topography

Scale 1" = 2000'

Galasso Quarry Expansion Color Aerial Map

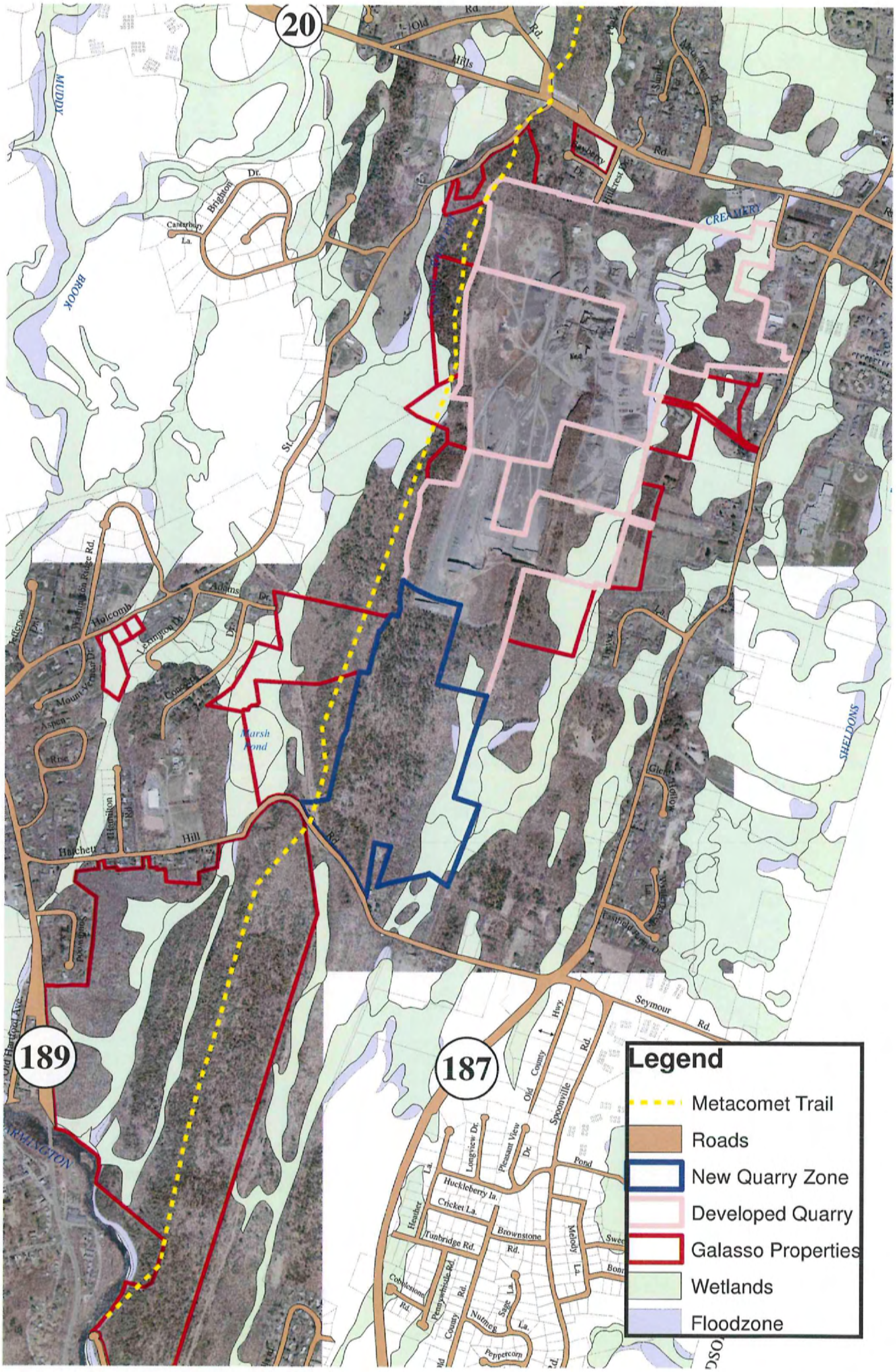
The Connecticut Environmental Review Team

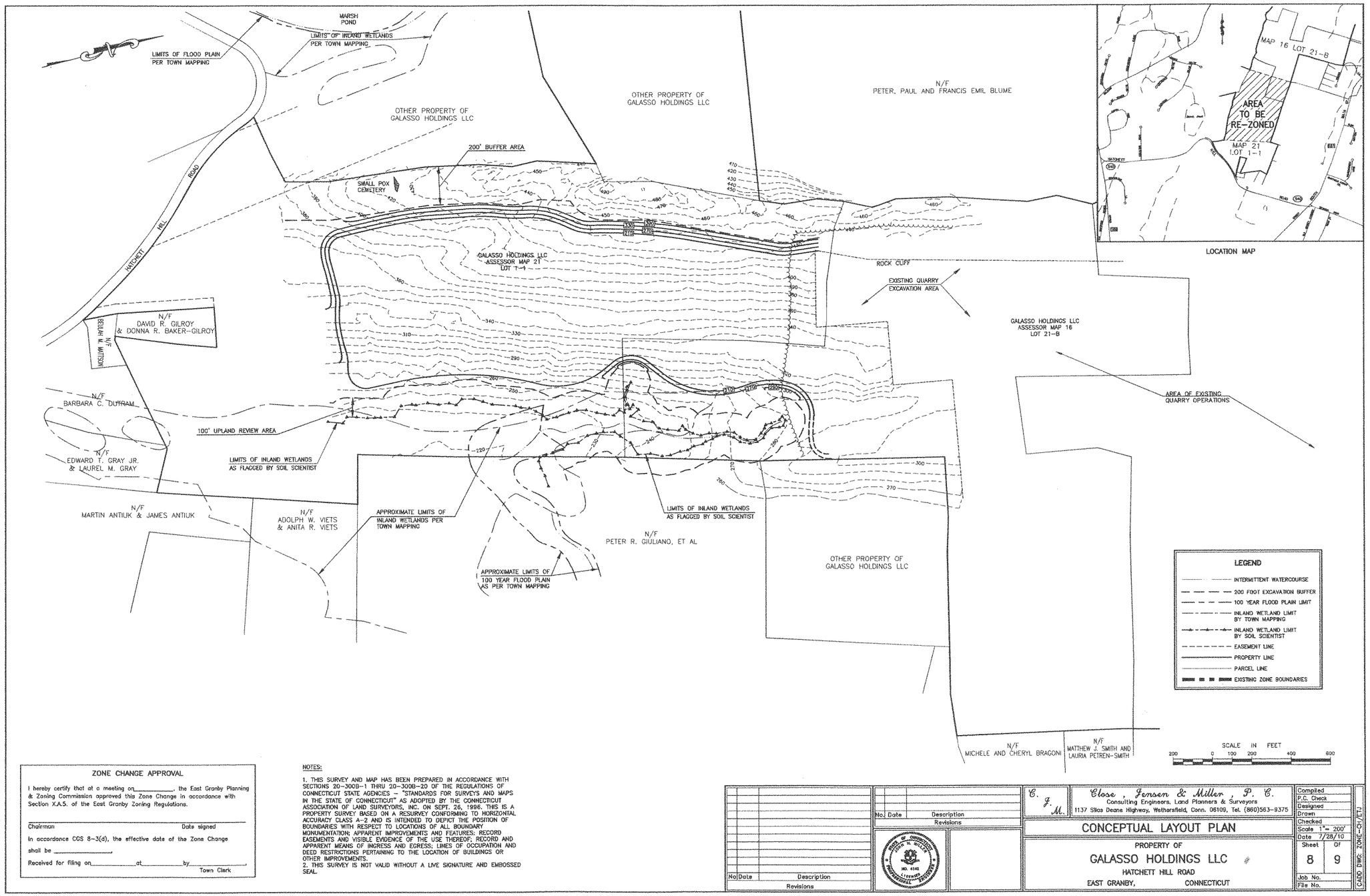
This map was prepared by Amanda Fargo-Johnson for the Connecticut Environmental Review Team.
This map is for educational use only.
It contains no authoritative data.
June 2012.

N
W E
S

0 0.1 0.2 0.4 0.6 Miles

East Granby, CT


Legend
Metacomet Trail
Roads
New Quarry Zone
Developed Quarry
Galasso Properties
Wetlands
Floodzone
20
189
187
MUDDY
BROOK
CREAMERY
SHELDONS
Marsh Pond
Seymour
Rd.
Spoonville
Old County Hwy.
Huckleberry la.
Cricket La.
Brownstone
Tunbridge Rd.
Melody
Longview Dr.
Pleasant View Dr.
Heather La.
Cobblestone
Pennywhistle Rd.
Nutmeg
Sage La.
Peppercorn
Pond
Hill
Hatchett
Hamilton
Holcomb
Adams Dr.
Lexington Dr.
Mount Vernon Dr.
Aspen
Rise
Concord
Brighton Dr.
Canterbury La.
Old Hartford Ave.
Hills
Old
Rd.
St.
Bayberry
Hillcrest
FARMINGTON



ZONE CHANGE APPROVAL

I hereby certify that at a meeting on_____, the East Granby Planning & Zoning Commission approved this Zone Change in accordance with Section X.A.5. of the East Granby Zoning Regulations.

_____
Chairman Date signed

In accordance CGS 8-3(d), the effective date of the Zone Change shall be _____,

Received for filing on_____at_____by_____,
Town Clerk

NOTES:

1. THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20-300B-1 THRU 20-300B-20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPT. 26, 1996. THIS IS A PROPERTY SURVEY BASED ON A RESURVEY CONFORMING TO HORIZONTAL ACCURACY CLASS A-2 AND IS INTENDED TO DEPICT THE POSITION OF BOUNDARIES WITH RESPECT TO LOCATIONS OF ALL BOUNDARY MONUMENTATION; APPARENT IMPROVEMENTS AND FEATURES; RECORD EASEMENTS AND VISIBLE EVIDENCE OF THE USE THEREOF; RECORD AND APPARENT MEANS OF INGRESS AND EGRESS; LINES OF OCCUPATION AND DEED RESTRICTIONS PERTAINING TO THE LOCATION OF BUILDINGS OR OTHER IMPROVEMENTS.
2. THIS SURVEY IS NOT VALID WITHOUT A LIVE SIGNATURE AND EMBOSSED SEAL.

No.	Date	Description
		Revisions

No.	Date	Description
		Revisions

STATE OF CONNECTICUT · JOHN K. MILLER · NO. 4143 · REGISTERED LAND SURVEYOR

C. J. M.

Close, Jensen & Miller, P.C.
Consulting Engineers, Land Planners & Surveyors
1137 Silas Deane Highway, Wethersfield, Conn. 06109, Tel. (860)563-9375

CONCEPTUAL LAYOUT PLAN

PROPERTY OF
GALASSO HOLDINGS LLC
HATCHETT HILL ROAD
EAST GRANBY, CONNECTICUT

Compiled	
P.C. Check	
Designed	
Drawn	
Checked	
Scale	1"= 200'
Date	7/28/10
Sheet	8 Of 9
Job No.	
File No.	

CADD DWG: ZONE-CH/ETJ

Topography and Geology

The area is underlain by the Holyoke Basalt (see Figure 1), a 200-million year old lava flow that has been tilted about 20^{o} toward the east. The land surface reflects the orientation of this layer of hardened lava, because the lava rock, which geologists refer to as basalt, was fairly resistant to erosion during the last ice age. It is a trap-rock ridge that rises abruptly on its west from a valley elevation of around 250' to a ridge-top elevation of just greater than 490'. The eastern slope of the ridge is more gentle, but consistent at15-20^{o}, and falls to a valley elevation of 200-230'. The ridge has several breaks in it that are areas where the rock is more fractured and thus more susceptible to erosion. Rte. 20 goes through a break to the north of the Galasso quarry (only a small portion of Rte. 20 is seen in the NE corner of Figure 1) and Hatchett Hill Road (seen at lower left corner of Fig. 1a) passes through the erosion gap to the south of the property. The geological map suggests that faults are responsible for both erosion gaps.

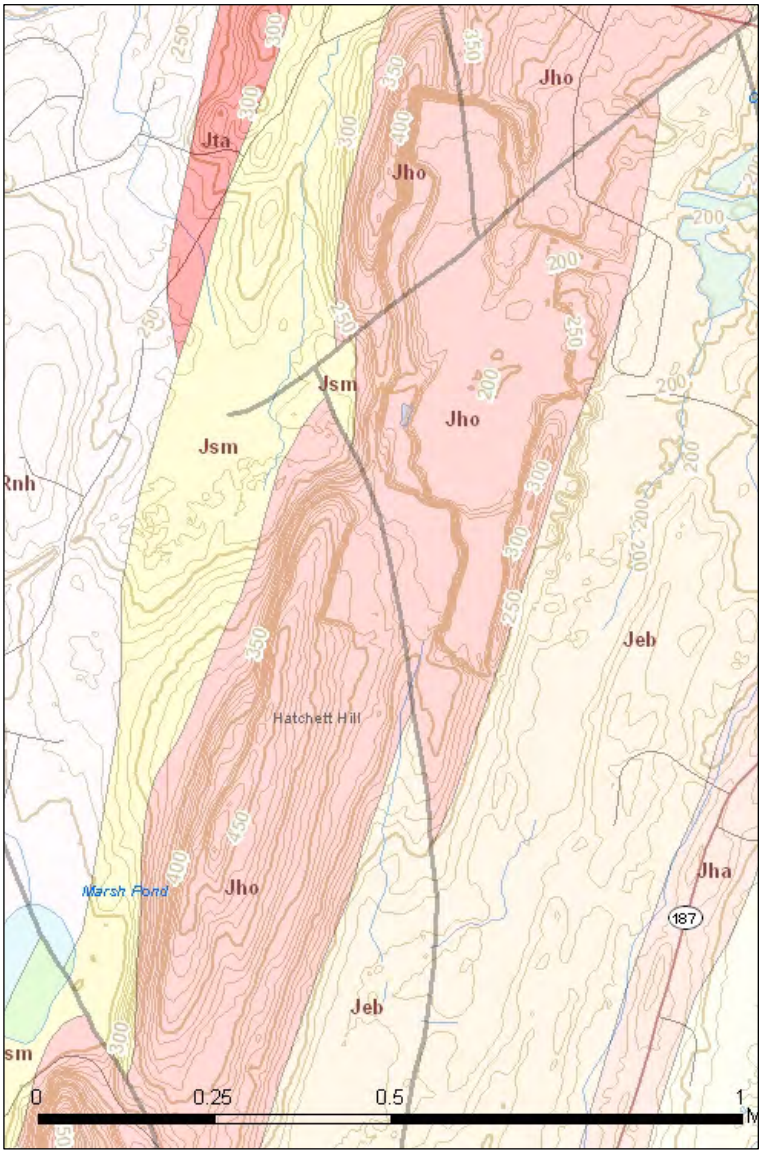


Figure 1a. Geologic map of Hatchett Hill (expansion parcel of Galasso Materials, LLC) on a topographic base map. Topographic contours = 10'. Area where material has been removed is distinctive flat bottomed area with closely spaced contours (near vertical walls) surrounding. Geologic map (from Rodgers, 1985, after Schnabel and Eric, 1964) shows area underlain by different rock layers. Each layer is indicated by a distinctive color and a letter symbol. The Holyoke Basalt layer is colored pink on the map and has the letter symbol Jho. Overlying the Holyoke is the East Berlin Formation (Jeb) and underlying is the Shuttle Meadow Formation (Jsm), both sedimentary rock layers ("brownstone"). Several faults (heavy black lines) cut diagonally across the ridge. Scale at bottom in miles.

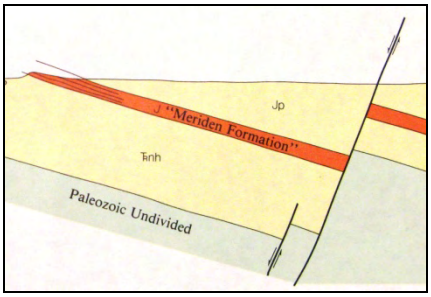


Figure 1b. Schematic east-west cross-section (looking north) showing eastward tilt to the rock layers. "Meriden Formation" includes the Holyoke Basalt. (From Rodgers, 1985)

Figure 2. Broad terrace (~100' in width) in the middle of 15-20^{o} slope near southern end of expansion parcel, looking northward. Elevation ~355'. Easterly slope continues to right of image. Wetland soils occupy the terrace.

The general eastward slope is broken by a NW-SE oriented swale and a north-south oriented terrace, both in the southern half of the parcel. The terrace is a wet area at an elevation of 355'.

Bed rock Geology

The geology of the area is relatively simple: layers of sedimentary and volcanic rock are tilted eastward about 15-20^{o} (see figure 1b above and Figure 3). Because of this it is easy to predict the geometry of the rock bodies and to calculate the amount of product that might be mined.

a.

b.

Figure 3. Eastward dip (tilt) of basalt layer (looking south) at southern head-wall of quarry (northern end of expansion parcel). Existing slope of the land surface mimics the dip (tilt) of the layer but appears slightly less than tilt of rock layer. Weathered rock at surface has the characteristic tea-brown color whereas fresh rock is gray (see Figure 4). Note different fractures in Fig. 3b. To the left of center of image is a slightly darker zone with numerous parallel fractures. These are oriented NW-SE and are related to the faults that cut the rock. Possibly this is a minor fault zone. Other, seemingly irregular, fractures (right side of image) cause rock to break in different planes. These are cooling fractures.

The formation being mined is the Holyoke Basalt. It is 300'± thick and is quarried at many places in Connecticut and Massachusetts. When crushed it makes an excellent construction stone and road-base. It is composed of basalt, popularly referred to as trap-rock.

Figure 4. Fresh and weathered surfaces of basalt

The basalt originated as a lava flow, issued from fissures that extended from Milford to Stafford Springs and on into Massachusetts. When the lava cooled it solidified by forming tiny interlocking crystals of plagioclase feldspar (a calcium-sodium-aluminum silicate) and pyroxene (an iron silicate). They form a very tough and durable rock. It is naturally a gray to dark gray color on a freshly broken surface, but exposure to the elements causes the iron-bearing minerals to form a tea-brown patina on the weathered rock surface (Figure 3 and 4).

Natural outcrops (Figure 5) of the rock are typically weathered to a tea brown color and are for the most part found only along the crest of the ridge and on westward facing cliff faces.

Figure 5. Natural outcrop of basalt along Metacomet Trail along the ridge crest, south of the summit of Hatchett Hill on parcel. Person carrying black trash bag for scale.

Once solidified, the lava rock continued to cool and in the process shrank in volume. This resulted in cooling fractures forming in the rock (see Figure 3b). These fractures form at the top and bottom surface of the cooling rock layer and propagate inward. They are near vertical to start out but some curve as they propagate inward. These fractures form a network of planar void spaces in the rock through which water can flow or be stored. It is referred to as fracture porosity.

Additional fractures form in the rock at various times as a result of natural stress (tectonic) placed on the rock long after solidification. Possibly numerous earthquakes led to the formation of fractures parallel to the faults that caused the earthquake. These fractures are generally parallel to each other and form at a given angle to the principle stress direction. Several northwest-southeast trending faults are shown on the map (Figure 1). NW-SE trending fractures were evident in the portion of the quarry that we visited (see Figure 3b and 6). These

fractures intersect the cooling fractures increasing the fracture porosity and enhancing the ease with which water flows through the rock, which we refer to as permeability.

Figure 6. Tectonic fractures on west headwall in southern portion of quarry. Fractures are near vertical and cut diagonally into the rock face.

Surficial Geology

Glacial soils cover the ridge. They range from a few inches to several feet in thickness. These soils consist of glacial till that has been modified at the surface by various soil forming processes. Glacial till is soil-like material that is deposited by glacial ice during and at the end of the last ice age. Till is a particulate substance with particles that range in size from mud (<0.625 mm in particle diameter) to glacial boulders and glacial erratics (up to several meters in diameter).

Glaciers are persistent masses of ice (greater than a kilometer in thickness in Connecticut) that deform under their own weight (in a way like silly-putty): the ice flows. Generally the ice flows from the areas where it accumulates (and is thickest) toward the direction where the ice is melting and therefore thinnest (generally southward in Connecticut). In the process, the ice scrapes the ground surface over which it moves and erodes that surface by numerous processes. This results in abundant rock and soil debris being entrained by the glacial ice. Some of the debris may be plastered beneath the glacier onto the ledge over which the glacier moves. The weight of the glacier compacts this material. Geologists refer to this as basal till (sometimes it is called lodgment till); in New England compact basal-till is routinely referred to as “hard-pan” by the non-geological community. At the end of the ice age, the ice melts. All the debris still entrained by the glacier gets left on the ground similar to the way sand spread on highways during a snow storm accumulates along the side of the road when the plowed snow melts. This is referred to as melt-out till. It is not compact, generally is more sandy and less clayey, making it more permeable.

Till covers practically the entire eastward sloping portion of the expansion parcel. It contains abundant fine grained material but also numerous granules and cobbles of basalt and locally of “brownstone” (Figure 7). The till is interpreted to be melt-out till because it transmits shallow groundwater that in several places emerges at the surface as springs.

Over most of the area cobbles and boulders in the till consist almost exclusively of basalt, the underlying material (see Fig. 7b). In two places, however, abundant “brownstone” cobbles and boulders are found (Figure 8). One area is at the southern end of the working quarry. There, large boulders of siltstone and very fine grained sandstone of the East Berlin Formation are found. This area is just south of a known fault that was mapped by Schnable and Eric (1964). The fault uplifted the northeast side, protecting the sedimentary rocks on the

southwest side from erosion. Thus, large blocks of East Berlin Formation are incorporated in the till at that location (see Figure 8a).

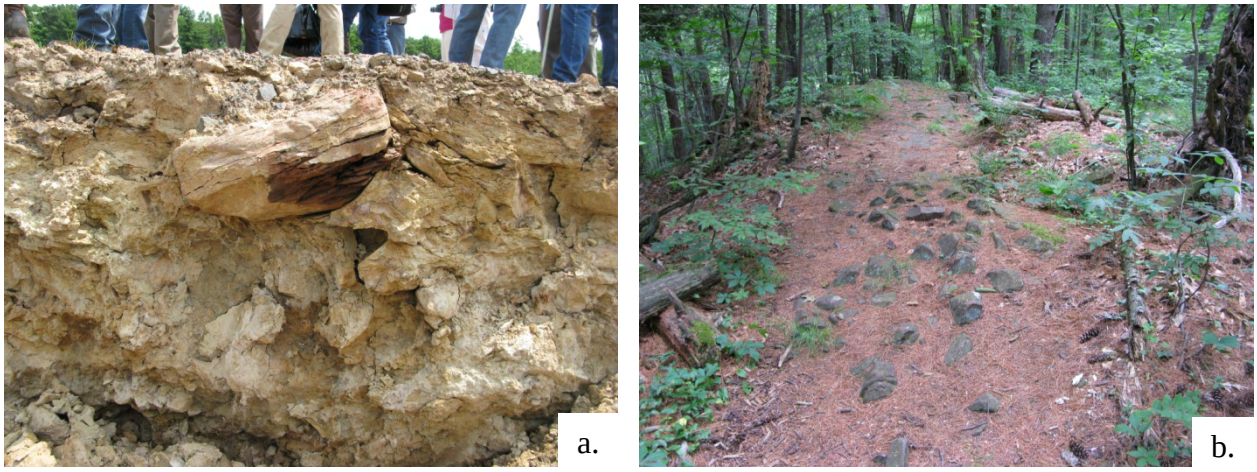


Figure 7. a. Glacial till excavated in quarry area. Cobbles and pebbles set in a matrix of compacted mud. Compact basal till found at this location (southern end of active quarry). Note that largest rock is "brownstone" while all remaining are basalt. b. Basalt cobbles weather out of till along Metacomet Trail. No "brownstone" cobbles seen at this location.

A second location with notable cobbles of "brownstone" is associated with the swale (see topography depicted on Figure 1a) and terrace (see Figure 2) noted in the southern part of the expansion parcel. The geomorphology, along with the occurrence of "brownstone" cobbles in the till, suggest the possibility that an unmapped fault caused a more easily erodible zone that formed the swale. Uplift on the northeast side of the fault may have acted to protect East Berlin Formation on the southwest side of the fault in a manner similar to the fault farther to the north.

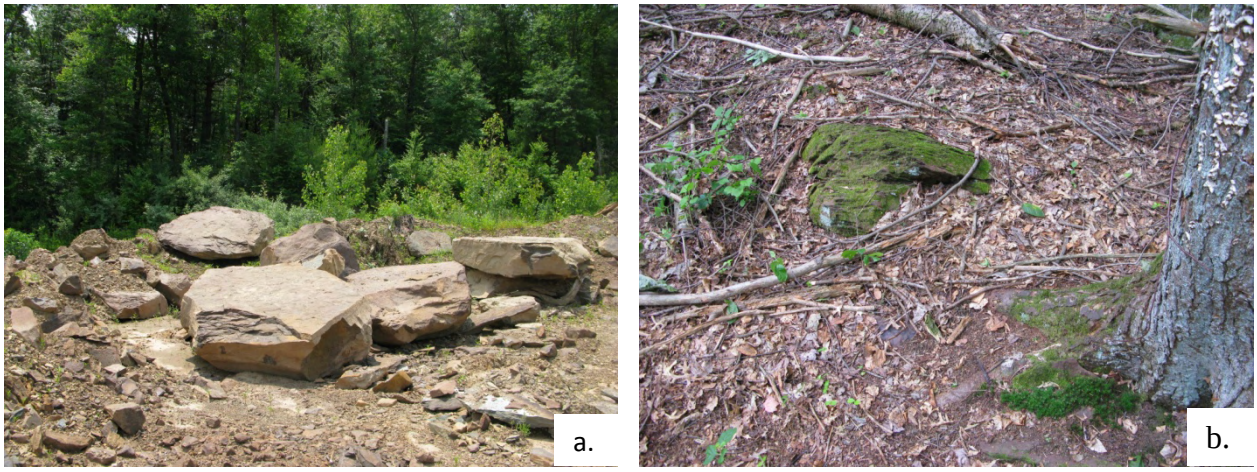


Figure 8. a. Large boulders of "brownstone" that were part of the till at southeastern corner of current active quarry. Uplifted fault block just to northeast. b. Area in northern most terrace area with numerous cobbles of "brownstone" (illustrated). Abundant "brownstone" cobbles and boulders in the till are notable because they are scarce to absent in most places. That there are several in this area asks for an explanation.

Hydrologic Observations

The quarry floor is mostly dry, even after a week of sometimes heavy rainfall (6/11/12). Quarry personnel report that flooding is not an issue on the quarry floor. This suggests that the basalt rock that forms the floor of the quarry is both porous and permeable. Because no pores (vesicles) were seen in the basalt, the porosity and permeability must be derived from the fractures. The regional water table is located at some depth (5 feet?) below the quarry floor.

This observation is of interest because the easterly slope of the expansion parcel has several springs (Figure 9) and wetlands at elevations between 275 and 425 feet as well as a stream course at a lower elevation. This suggests that rain water and snow melt (meteoric water) are unable to completely soak into the rock. Meteoric water may soak into the soil but then runs downhill as shallow ground water, probably at the soil rock interface. Although some water may seep into the fracture system, most of the meteoric water does not recharge the regional ground water system.

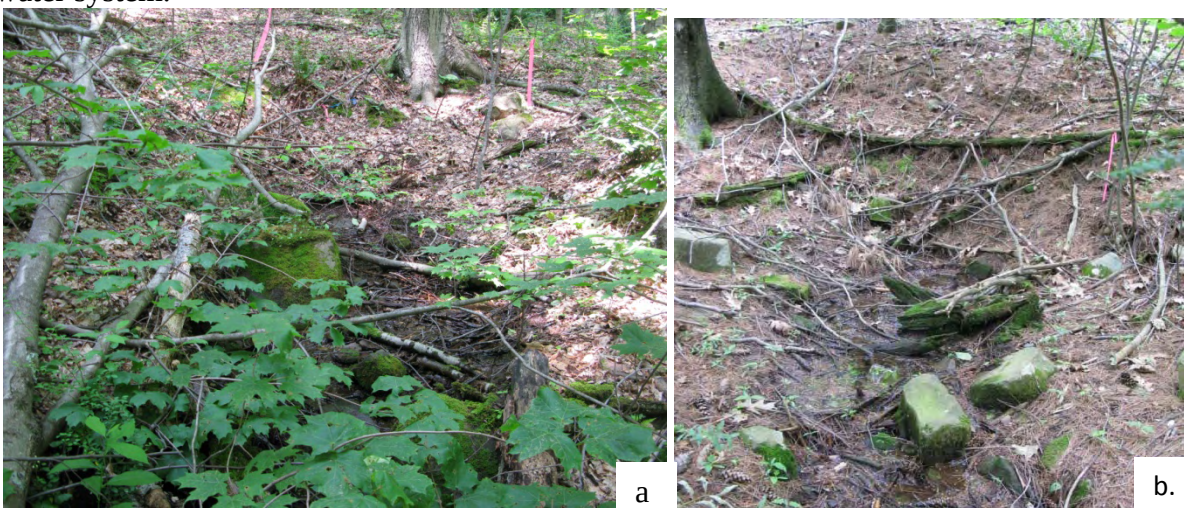


Figure 9. a. Spring at an elevation of about 270' near north end of expansion parcel. Both this spring and the one illustrated in Figure 9b abruptly end up hill, suggesting something unusual initiated the discharge. The event may have been a tree-fall or possibly something related to human farming. b. Spring at an elevation of ~415 near northern boundary of expansion parcel.

The reason for that is not readily apparent to this reviewer. Perhaps the quarry operations, particularly the blasting, cause the fractures to open up, facilitating recharge of the aquifer by seepage of all the water that falls onto the quarry floor. Alternatively, the fractures in their natural state on the hill slopes may be clogged by till, decreasing the permeability and preventing recharge. Because the water cannot seep into the rock fractures, it slowly flows down hill and appears at springs that are initiated by tree falls (or human activity) and groundwater sapping.

Traprock Ridgelands

The Holyoke Basalt, because of its geometry and resistance to glacial erosion, is the prime geological layer responsible for creating the traprock ridgelands in Connecticut and Massachusetts. Its outcrop pattern has produced a linear ridge topography that extends from Branford, through Cromwell. The ridge line is off-set by faults to Meriden, where it extends northward as a continuous ridge, with few breaks, to the Holyoke Hills in Massachusetts. The

flora and fauna of ridgelands contain unique elements (in part because of the chemistry of soils developed on the basalt) that are environmentally sensitive (Wetherill, 1997; LeTourneau, 2008). As the floor of the Connecticut Valley becomes more and more developed the importance of the ridgelands as habitat and refuge becomes more and more accentuated. Galasso's quarry operations have narrowed the ridgeland significantly and illustrate well the conflict between ecological preservation and the extractive mineral industry as well as the dilemma faced by land planners and regulators.

References Caited

LeTourneau, P.M., 2008, Traprock Ridgelands: the environmental geography of threatened landscapes of the Connecticut Valley, *in* Van Baalen, M.R. (ed), Guidebook to field trips in MA, and adjacent reions of CT and NY, 100th Ann. Mtg, N.E. Intercoll. Geol. Conf., p.257-306.

Rodgers, John, 1985, *Bedrock Geological Map of Connecticut*. State Geological and Natural History Survey of Connecticut, Nat'l. Resource Atlas Series, 1:125,000, 2 sheets.

Schnable, R.W., and Eric, J.H., 1964, Bedrock Geologic Map of the Windsor Locks Quadrangle, Hartford County, Connecticut. U.S. Geol. Survey, Geol. Quad. Map, GQ 388.

Wetherill, D.V., 1997, Traprock Ridges of Connecticut: Connecticut Dept. Environ. Protect. Bull. 25, 58p.

Conservation District Review

The ERT was requested primarily to address concerns regarding sensitive natural and cultural resources that may be impacted by the proposed 75-acre quarry expansion. The District review encompasses soils, wetlands, wildlife, and future land use. (Please see the Appendix for the custom soil resource report.)

NCCD directly obtained figures from Environmental Planning Services depicting the property overlaid on aerial photographs. The figures are part of the "Wetland Biological Inventory and Functions and Values Assessment" but they were not included in the version of the assessment forwarded by the ERT coordinator. The property lines depicted on the figures appear inconsistent with other maps provided by the applicant, especially in the area of the "Blue-spotted Salamander Vernal Pool". Differences in scale and location make it difficult to assess the proximity of the pool relative to the proposed excavation, especially in reference to Dr. Klemens' recommendations for protection of vernal pools (see below). The District acknowledges that the materials submitted by the applicant for the ERT review may not represent a typical submittal for a municipal wetland review. However, the information provided thus far is insufficient to for a comprehensive review of wetland and natural resource issues.

Wetlands

Scope of Review

The proposed quarry expansion plans include the initial excavation of the north-westerly isolated wetlands (Wetland 3 and the intermittent stream), with future excavation proposed to include the southernmost wetlands (#4 and #5), as the 70-acre expansion will require special permits for each 20-25 acre phase, working north to south. The "Wetland Biological Inventory and Functions and Values Assessment" report ("wetland report") does not include detailed assessment of Wetland #2, the intermittent stream east of Wetland #2, or the intermittent stream depicted by flags #WL-31 through WL-38, which are considered "off-site" according to the wetland report. The quarry expansion under consideration by the ERT, as described to participants during a project briefing on the day of the field review and further identified on maps provided by the applicant's attorney prior to the ERT field walk, did include excavation of the area encompassing these three wetlands, so there appears to be some discrepancy regarding the scope of review. Regardless, all of the isolated wetlands west of Wetland 1 will be eliminated by future quarry activity and are included in our discussion below. Some of their functional characteristics are likely to be similar to the isolated wetlands discussed in the report, considering their location in the watershed relative to the major system identified as Wetland 1.

Functional Value

The wetland report identifies the primary functions of "on-site" wetlands (other than Wetland 1, which is a high value system) as groundwater recharge/discharge and flood-flow alteration. The *significance* of these functions and how these functions affect local hydrology are not addressed. Furthermore, there is no assessment or discussion of the impact of eliminating the wetlands.

While Wetland 1 is located predominantly outside of the proposed quarry boundaries, as the "Progress Report" letter from Dr. Michael Klemens, the consulting project ecologist, suggests, it is important to understand the role that the adjacent upland and the isolated wetlands may play in recharging groundwater, which may provide hydrological support to the biologically significant Wetland 1. Eliminating wetlands within the local watershed, as well as adjacent upland catchment areas, may impact the viability and productivity of the extensive, highly functional wetland through changes in water level or quality resulting from the adjacent quarrying activities. These impacts should be analyzed

The proposed quarry expansion will eliminate several wetland areas. The applicant has not adequately addressed all functional values associated with these wetland and the significance of their elimination, as discussed above. In addition, even smaller isolated wetlands serve some general habitat function by providing conditions that favor hydrophytic vegetation. For this reason, regulatory efforts typically have a general goal preserving existing wetland area (often referred to as "no net loss"). For this reason and in order to maintain other wetland functions, wetland mitigation is often proposed to off-set unavoidable wetland losses. The ERT was not made aware of any proposal by the applicant to mitigate for the proposed wetland loss. Given the scope of project, off-site mitigation may be considered.

Wetland Dependent Wildlife

Wetlands within the quarry site support a number of sensitive species. The majority of the proposed quarry expansion area is mapped within the CT DEEP's Natural Diversity Database as an area containing species of special concern, including several species of plants, as well as a species of bird, and a species of salamander. Of particular concern, based on site conditions and species sensitivity, is the Jefferson Salamander complex. The Jefferson Salamander complex has been declining in population due to its intolerance to land use disturbance and habitat fragmentation. While Jefferson Salamanders were not observed to be breeding on-site, the site is within their known upland range.

The wetland report identified two state listed species of special concern that were observed in the vicinity of the subject property. The blue-spotted salamander complex was observed to be breeding within an on-site vernal pool in the southeastern corner of the property. While no quarrying activities are proposed in the immediate vicinity of the vernal pool, the proposed excavation in the adjacent upland and wetland areas may impact hydrological support to the easterly wetland system, which includes the pool identified as a viable blue spotted salamander breeding pool. Dr. Klemens' letter recommends no disturbance within 100 feet of the high water mark of the vernal pool, and less than 25% clearing in the area located between 100-750 feet from the high water mark of the vernal pool, "for maintaining the integrity of high quality vernal pools" .These limits have not been mapped relative to the proposed limits of the quarry.

The other state listed species of special concern observed during the biological inventory conducted for the wetland report is the eastern box turtle. The eastern box turtles were observed to the north of the project area, adjacent to both existing and proposed quarry operations. According to Dr. Klemens, the box turtles have a preference for the edge habitat created by the

quarrying activity, and while this habitat could be enhanced to benefit the turtles, efforts should be taken to protect the turtles from entering active quarry areas, as described by Dr. Klemens.

Future Land Use

Municipal concerns regarding the long-term use and reclamation of the site are unchanged from those in 2004, when the first ERT for this project was done. At that time, the District recommended that the applicant and town initiate a long-term planning effort to explore options for future use of the quarry. The District is not aware that any such effort has been initiated since 2004.

The quarry is discussed in the Town's Plan of Conservation and Development as a future land use concern. The District recommends that the town require the landowner to develop a master conceptual plan for future excavation and eventual restoration of the site as a condition of any permit allowing expansion of the specially permitted quarry area.

In addition, the town has expressed concerns regarding the future of the ridgeline, along with the Metacomet trail that runs along it. While quarry representatives maintain that the town's required 200' buffer between quarrying activities and the property line will protect the Metacomet trail, the adjacent properties to the west are also owned by Galasso Holdings LLC. No trail easement currently exists on the property, which would provide additional legal protection of the trail itself.

Conclusions

The wetland report does not adequately address impacts to onsite wetlands from direct impacts, potential hydrological impacts to Wetland 1 and the embedded vernal pool resulting from impacts to the drainage area, and does not address the potential need for wetland mitigation. The need for additional hydrological assessment is supported by Dr. Klemens, who recommends that the site's hydrology be studied to determine potential changes to water levels within the vernal pool which may result from the adjacent excavation.

The District has previously recommended that the town be included in creating a long-term plan for the quarry, rather than being presented with individual requests for expansion. The District recommends that these items be addressed as part of any land use decision process regarding the quarry.

Stormwater Management

Galasso Materials LLC ("Galasso") is currently registered under the General Permit for the Discharge of Stormwater Associated with Industrial Activity ("the general permit"). Permit Number GSI000104 covers stormwater runoff from Galasso's quarrying, rock crushing and asphalt manufacturing operations and requires in addition to the general permit registration, a Pollution Prevention Plan ("PPP"), and the twice annual sampling of storm water.

All relevant Department of Energy and Environmental Protection ("DEEP") enforcement databases and files were perused as part of this ERT. Galasso has no outstanding violations at this site and has never received a violation from the DEEP's stormwater section. All sampling has been conducted pursuant to permit conditions with nothing noted in the samples to suggest the site is being mismanaged with regard to stormwater.

Although the proposed expansion will not trigger registration with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction, Galasso will be required to modify their PPP to reflect the sequencing for the expansion. Additionally, the best management practices and engineered controls for construction activities contained in the 2002 Connecticut E&S Guidelines will need to be followed during the expansion.

Galasso will need to carefully monitor the periphery of the site to evaluate the need for additional outfalls during and after construction sequencing and take extra care in the delineated wetland buffer zones to ensure they are not impacted by inadvertent sediment discharges during the expansion.

Wildlife Resources

Background

The Galasso property is over 500 acres, with approximately 160 acres in active quarry. There is a proposal to expand the existing quarry southward by approximately 75 acres, to be mined in approximately 20-25 acres parcels over many years, beginning in the north and moving south. There will be a 200 foot buffer along the border of the property (required). The Metacomet Trail, which parallels the parcel's western boundary, is part of this buffer and will remain undisturbed. The reclamation plan includes processing on site and leaving the overburden; and re-spreading the overburden to a depth of approximately 4 feet. The town Planning and Zoning Commission requested a review of the quarry expansion plan to assess potential impacts to the site's natural and cultural resources.

Existing Wildlife Habitat

Forested Uplands

The property is mostly mature deciduous forest composed of mixed hardwoods and conifers, including small hemlock stands, present throughout much of the western portions. Throughout this western portion, the canopy is mostly closed and the understory sparse to moderate, and includes footpath trails. Forested areas in general are valuable to wildlife, providing food (berries, buds, acorns, seeds, and catkins), cover, nesting and roosting places, and denning sites. Trees, both living and dead, serve as a home for a variety of insects, which, in turn, are eaten by many species of birds, including woodpeckers, warblers and nuthatches. Other wildlife species found in this habitat type include barred owl, grey squirrel, eastern chipmunk, white-footed mouse, redback salamander and eastern garter snakes. The southwestern boundary of the property is marked by a steep drop in slope.

Forested Wetlands

The eastern portion of the property contains forested wetlands with a well-developed shrub layer that provides structural diversity. Vegetative and structural diversity such as this provides valuable cover, nesting sites, roosting sites and, in many cases, abundant food for wildlife. Many species of reptiles and amphibians, such as the gray tree frog and the spotted salamander, use wetlands for breeding and spend the balance of their time in the adjacent forested uplands. Many bird species use forested wetlands at varying times of the year for breeding, feeding and shelter. Examples include brown thrasher (state-listed species documented near the property), wood thrush, northern water thrush, common yellowthroat and eastern phoebe. Other wildlife likely utilizing this habitat for food and cover are raccoons, star-nosed moles, wood frogs, pickerel frogs, and spring peepers.

Impacts

Expanding the quarry will result in outright habitat and species loss, as mining operations replace the trees and shrubs that now serve as sources of food, cover and shelter for a wide variety of wildlife.

Mining operations may also have both direct and indirect impacts on species that utilize Marsh Pond (located at the bottom of the slope past the property's steep western border), such as the state-listed Jefferson salamander "complex", which has been documented near the pond. Any disturbance to the pond from quarry activities may degrade the quality of the pond, making it unsuitable for disturbance-intolerant species. Even if there are no direct impacts to the pond, many wetland-dependent species, such as green frog, wood frog and spotted salamander, may be impacted; in addition to wetland habitat, they also need adjacent upland to meet their habitat requirements, and this upland habitat will no longer be available. Most reptile and amphibian species are not very mobile and cannot easily seek out suitable habitat elsewhere once disturbance has occurred.

Additional impacts may also occur to the wetlands east of the property. Removing the eastern slope of the hill may reduce groundwater discharge into the wetlands, altering their composition and suitability for species currently utilizing them.

Reducing Impacts

The only way to maintain the quality of the available habitat on site is to leave the property undeveloped. Beyond this, all available measures should be utilized to ensure no impacts to the downslope Marsh Pond. Calhoun and Klemens (2002) recommend that the upland areas around breeding pools up to a distance of 750 feet be considered critical upland habitat, that at least 75% of that zone be kept undisturbed and that a partially closed-canopy stand be maintained. For more information on state-listed species habitat requirements and habitats of conservation interest, please see the NDDB section report.

Summary

The proposed project will replace the existing habitats with a quarry mining operation, resulting in a direct loss of these habitat types and their associated species. Additionally, there are potential impacts to the reptile and amphibian species that require uplands adjacent to wetlands such as Marsh Pond, including Jefferson salamander "complex". The impacts to wildlife currently utilizing the area should be expected to be significant.

References

Calhoun, A.J.K. and M. W. Klemens. 2002. MCA Technical Paper No. 5. Best Development Practices (BDPs): Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States. Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

The Natural Diversity Data Base

The Natural Diversity Data Base maps and files regarding the project area have been reviewed. According to the records, multiple State-listed species (RCSA Sec. 26-306) have been documented within or near the proposed project area.

State Listed Plants

According to the records, the following State-listed species have been documented on the Galasso Quarry property in East Granby, CT (please refer to the Appendix for additional information):

- **Bog willow (*Salix pedicellaris*)**

  Protection Status: State Endangered
  Habitat: Acid bogs and peaty shores, sometimes subalpine. Blooms late Apr - early Jun.

- **Cyperus-like sedge (*Carex pseudocyperus*)**

  Protection Status: State Endangered
  Habitat: Pond shores and shallow water. Blooms Jun-Jul.

Both of these wetland species could be negatively impacted if activities associated with the quarry expansion were to alter the hydrology of Marsh Pond and its surrounding wetlands.

In addition to the wetland plants listed above, the following plants have been documented on ridges in the immediate vicinity of the Galasso Quarry and may also occur on the property:

- **Dillenius' tick-trefoil (*Desmodium glabellum*)**

  Protection Status: State Special Concern
  Habitat: Dry woods and fields. Blooms Aug – Sep.

- **Narrow-leaved horse gentian (*Triosteum angustifolium*)**

  Protection Status: State Endangered
  Habitat: Open, rocky or sandy woods. Blooms Apr-Jun, fruits Jul-Sep.

- **Tall cinquefoil (*Potentilla arguta*)**

  Protection Status: State Special Concern
  Habitat: Dry roadsides, pastures, and ledges; often on traprock and marble. Blooms Jun -Jul.

- **Virginia copperleaf (*Acalypha virginica*)**

  Protection Status: State Special Concern
  Habitat: Dry, open soils. Blooms Aug – Sep.

Lastly, three habitats of conservation interest have also been identified on the Galasso property:

- **Medium Fen** – natural peatlands occupying topographically defined basins; often flooded by acidic surface water; on deep, poorly decomposed peats; dominated by sedges and/or shrubs.

- **Ash-Hickory Glade** – Slow-growing forests, primarily on or near the summit of basalt or other mafic rocks; dominated by ash and hickories, with few shrubs and an open grassy ground cover.

- **Subacidic Rocky Summit Outcrop** – Dry to xeric exposed summits, ledges, and other outcrops (primarily basalt and other mafic rocks) with a vegetation of low shrubs, grasses, and herbs.

For questions or more information regarding State-listed plant species or natural habitats, please contact Nelson DeBarros (nelson.debarros@ct.gov).

State-Listed Wildlife

The following State-listed wildlife species have also been documented on the Galasso Quarry property in East Granby, CT:

Brown thrashers (*Toxostoma rufrum*) are birds that nest in brushy second-growth tangles, briers and dense thickets. Their breeding season is approximately April through August and during this time are most susceptible to disturbances in their feeding and nesting habitat. Minimizing impacts to shrubby habitats during this time period will likewise minimize impacts to this species.

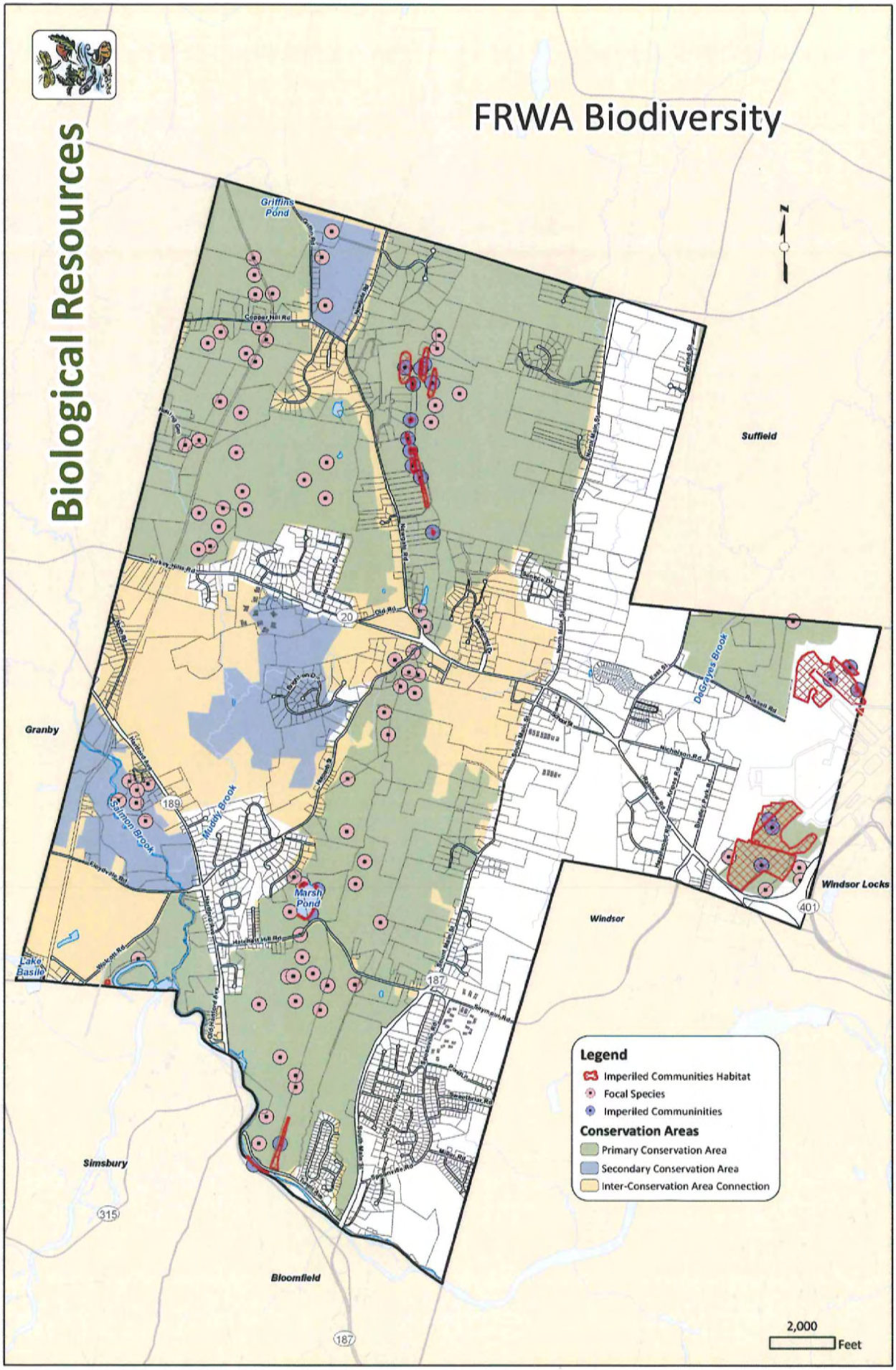
Jefferson salamander "complex" (*Ambystoma jeffersonianum*) results in the hybridization of the Jefferson salamander with the blue-spotted salamander (*Ambystoma laterale*). The hybrids can only be reliably distinguished by karyological and biochemical analyses. Jefferson salamanders prefer steep, rocky areas with rotten logs and a heavy duff layer. They are found in or near undisturbed second growth deciduous forests and their breeding pools may be in hemlock groves or grassy pasture ponds. Jefferson salamanders are not found in nor do they tolerate radically disturbed habitats. Blue-spotted salamanders are associated with riparian red maple swamps. They also occur in disjunct

vernal wetlands near red maple swamps. Both of these species actively breed from February through April. Additionally, these are pool-breeding amphibians; therefore changes in the water quality of those pools can negatively impact these species. (Please see the Appendix for further information.)

If the build-out plans include mining areas of Hatchett Hill west and down slope toward Marsh Pond, the DEEP Wildlife Division recommends that a herpetologist familiar with the habitat requirements of these species conduct surveys. A report summarizing the results of such surveys should include habitat descriptions, reptile and amphibian species list and a statement/resume giving the herpetologist's qualifications. The DEEP does not maintain a list of qualified herpetologists. A DEEP Wildlife Division permit may be required of the herpetologist to conduct survey work; you should ask if your herpetologist has one. The results of this investigation can be forwarded to the Wildlife Division and, after evaluation, recommendations for additional surveys, if any, will be made.

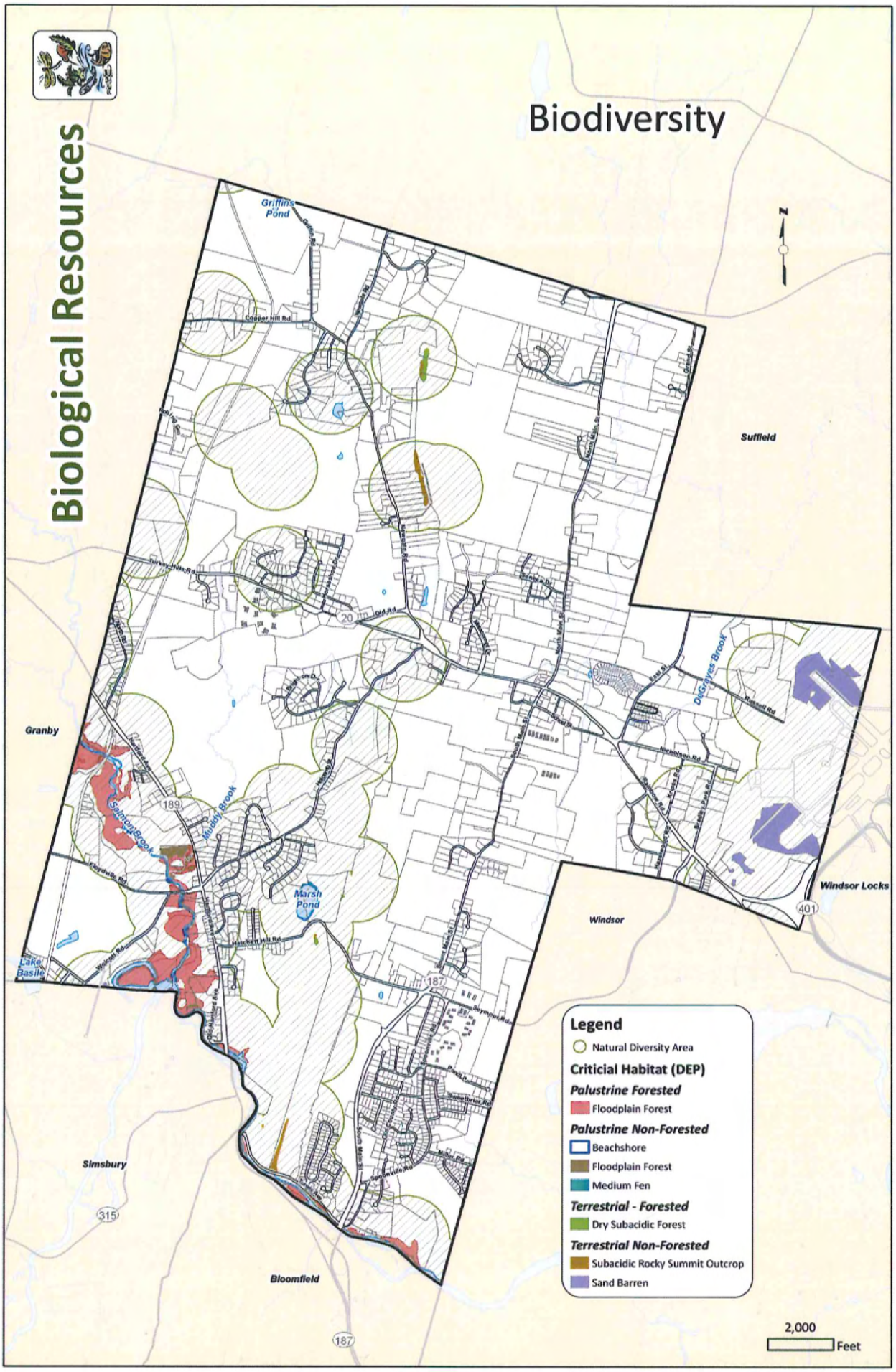
For questions or more information regarding State-listed wildlife, please contact Laura Saucier (laura.saucier@ct.gov).

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the CT Department of Energy & Environmental Protection, Bureau of Natural Resources and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available. If the proposed work has not been initiated within 12 months of this review, contact the NDDB for an updated review.


Biological Resources
FRWA Biodiversity
Griffins Pond
Copper Hill Rd
Suffield
Granby
Windsor Locks
Windsor
Simsbury
Bloomfield
Marsh Pond
Lake Basile
Muddy Brook
Salmon Brook
DeGraves Brook
189
20
187
315
401
Legend
Imperiled Communities Habitat
Focal Species
Imperiled Communinities
Conservation Areas
Primary Conservation Area
Secondary Conservation Area
Inter-Conservation Area Connection
2,000
Feet

Biological Resources

Biodiversity



Landscape Ecologist Review

Forestry/Vegetation

Core Forest

The proposed quarry expansion area is part of a larger block of core forest (mapped as between 250 and 500 acres in size) to the south and southwest of the Galasso Quarry (and owned, at least in part, by Galasso beyond the boundaries of the proposed quarry expansion). "Core forest" refers to the portion of a forested tract that is located away from the forest edge. Core forest is the interior area of a larger whole composed of the core forest and its surrounding buffer of "edge forest". From the small maps provided, it appears that a distance of (something like) 250 feet was used to represent edge forest. How much core forest a given area contains depends on the shape of the tract as well as the total forest area.

In a general way, reduction of the size of this forest block would tend to have negative effect on bird and mammal species which benefit from forest interior habitat (where, for example, conditions are more moist and the habitat is more free of predators that tend to roam along forest edges). In addition, removal of part of the core forest and its associated edge forest (as would happen if the quarry were to expand to the south) would then create a strip of edge forest in the remaining area of what once was core forest. The result would be that the core forest would be reduced by more than the cleared area (because to serve as core forest, a forest must have an additional buffer strip of edge forest).

Habitat Connectivity

The proposed expansion area is connected to an area of core forest mapped as greater than 500 acres in size to the north via the strip of forest in which the Metacomet Trail is situated. To the south, Hatchett Hill Road fragments the forest with a strip of non-forested road and forest edge habitat on each side. Beyond the southern forest edge habitat, there is additional core forest habitat (in two patches each less than 250 acres bisected by a utility right-of-way). Habitat connectivity is important because it allows the movement of species. Large patches of core forest may serve as "source habitat" (places where species can reproduce and their young can survive well enough to serve as a source of species for places where the habitat quality is not as good). Compromising the habitat quality in the core forest immediately south of the quarry has the potential not only for harming species that do better in interior forests, but also, it could lessen the quality of the habitat through which individuals disperse from the larger "source habitat" to the north. (And, breaking up the north/south habitat connectivity may have ramifications for species attempting to migrate to the north in the face of climate change.)

A negative consequence of habitat connectivity is the potential for spreading unwanted organisms. Both Garlic Mustard (*Alliaria petiolata*) and Narrow-leaf Bittercress (*Cardamine impatiens*) were observed in the vicinity of the Metacomet Trail. The seeds of these species are readily spread by hikers. Right now, for protection of the connected habitat, it would be worth attempting to control these species along the trail.

***De Facto* Open Space**

The area of the proposed quarry expansion was not one of the areas designated as *desirable open space* on the Open Space Plan from the 2004 Plan of Conservation and Development. And, looking at the Potential Buildout Scenario map from the 2004 Plan of Conservation and Development, it becomes evident that the core forest currently present to the south of the quarry is *de facto* open space. *De facto* open space is undeveloped land that currently serves some functions of protected open space, but in fact, is not protected as open space. Thus, the enhanced habitat connectivity provided by the area proposed for the Galasso Quarry expansion currently is viable, but without some effort on the part of the Town or other source of open space protection, its value is not secure.

Species Diversity

The traprock soils (Holyoke soil series) underlying much of the proposed quarry expansion area are rich in nutrients. In addition, local variability in the availability of soil moisture contributes to differences in plant species composition. The availability of soil moisture is influenced by topographic position (ridgetop, upper-, mid-, and lower-slopes, low-lying streamside). Available soil moisture also is influenced by variations associated with different soil types that affect drainage (e.g., rock outcrops, shallow to bedrock, well-drained soils, or soils with dense till layers that restrict drainage). For the tract, as a whole, the combination of nutrient rich soil quality in much of the area and microsites varying in moisture availability offers the opportunity for a greater plant species diversity than is commonly found in a relatively small area of the typical Oak-Hickory forests of Connecticut. Tree species observed on the site ranged from Pitch Pine (*Pinus rigida*; very dry sites) to Basswood (*Tilia* sp.; moist sites) to Red Maple (*Acer rubrum*; cosmopolitan including wet sites).

Several areas with dead and dying Eastern Red cedar (Juniperus virginiana) were observed. Their presence indicates areas that formerly were open, as did the scattered presence of White Oak wolf trees (*Quercus alba* with a large, spreading form) and Sassafras trees (*Sassafras albidum*).

Restoration versus Re-Use Plan

"Restoration" would imply that some ecological function or state were being restored. For clarity, one should say, a plan for *restoration of* _____ or a plan for *restoration to provide* _____, not just a plan for *restoration*. Restoration could involve a diversity of goals, for example; one might restore habitat to provide early-successional, shrubby habitat; to provide nesting habitat for pileated woodpeckers; to provide large straight trees suited to timber production; to provide water quality up to drinking water standards; to provide streambank vegetation to make shade to keep stream temperatures cool; and so on. Within a large property, the size, location, and desired appearance of the sites chosen for restoration could vary depending on the restoration goal.

The goal for ecological restoration efforts is a social value (i.e., people choose what functions and what conditions they think are worth restoring [or creating]). The way the chosen goal is reached is through an applied ecological understanding of what it takes reach the desired outcome. It should be noted that certain restoration goals may require particular types of management for their maintenance.

A re-use plan could be ecological restoration. It also could be a shopping mall.

Metacomet Trail

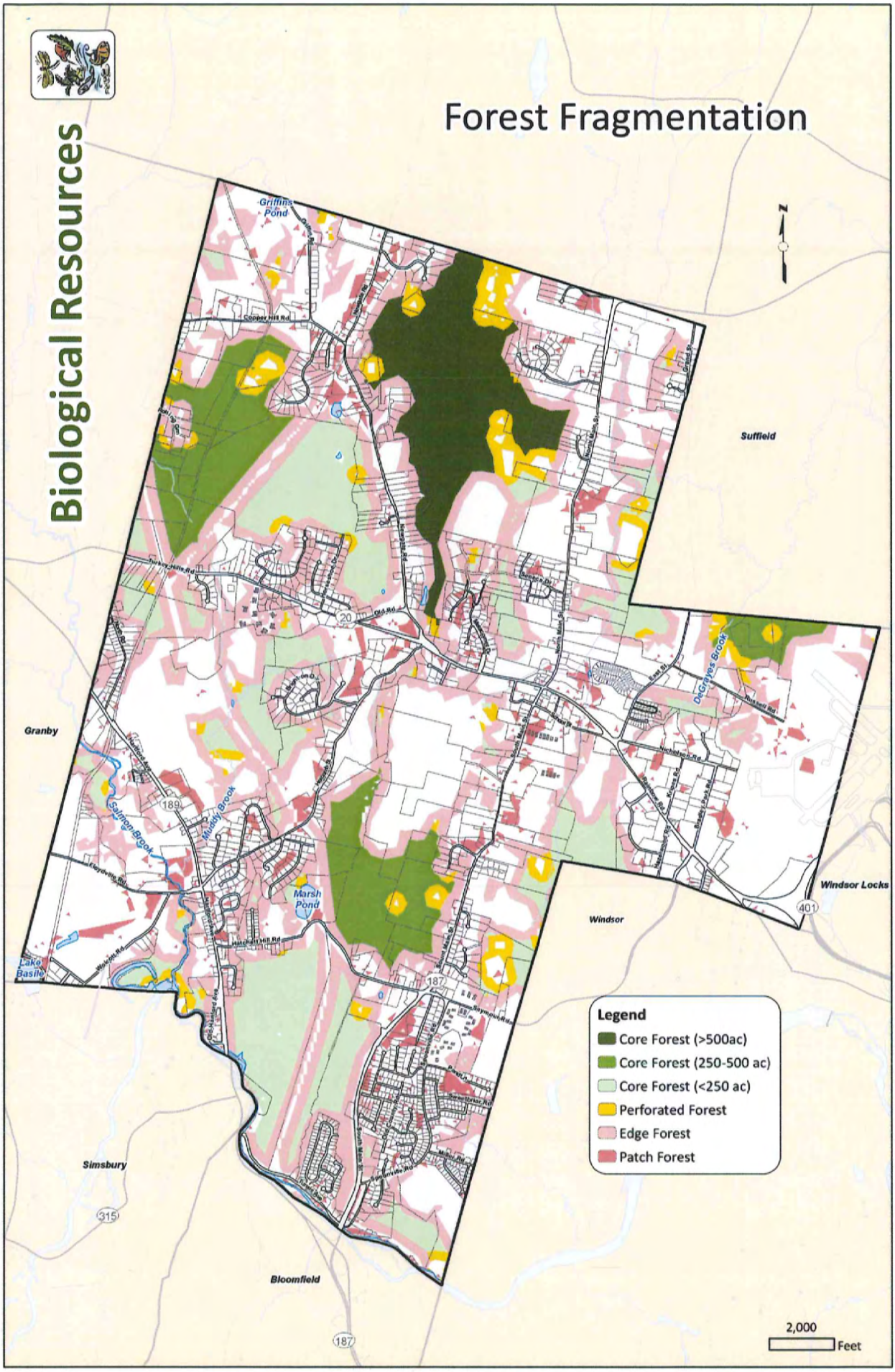
The proposed quarry expansion would include a 200 foot buffer between the Metacomet Trail and the quarry. This would visually screen the quarry from the trail users at least in the summer. (Note that it is possible to use GIS to model what can be seen from where.) In my opinion, the 200 foot buffer would not protect hikers from the sound of the quarry. If the trail right-of-way is legally owned by Galasso, perhaps a friendly trailhead sign pointing out that Galasso generously allows hikers on their property might help.

Were the quarry to expand, then, speaking personally, this reviewer as a native of the West who feels closed in by eastern deciduous forests, I would appreciate a side trail with an overlook and (if I may be totally grandiose) a small sign with some interpretation of what trap rock is and the current and historical uses of rock taken from this quarry.

Finally, note again that regardless of what action is taken with the proposed quarry expansion, there is Garlic Mustard and Narrow-leaf Bittercress in the vicinity of the trail. These plants spread by seed carried by hikers and forest mammals. Removing these species where they are on or close to the trail will help prevent the spread of these invasive plants to other portions of the trail.

Biological Resources

Forest Fragmentation



The Metacomet Trail and Re-Use Concerns

The following comments reflect a policy-level critique of the proposed Galasso Quarry Expansion in East Granby rather than a detailed analysis. This reviewer will focus on two specific issues relating to: 1) the traprock ridge and associated hiking trail and 2) the need for site reclamation/reuse.

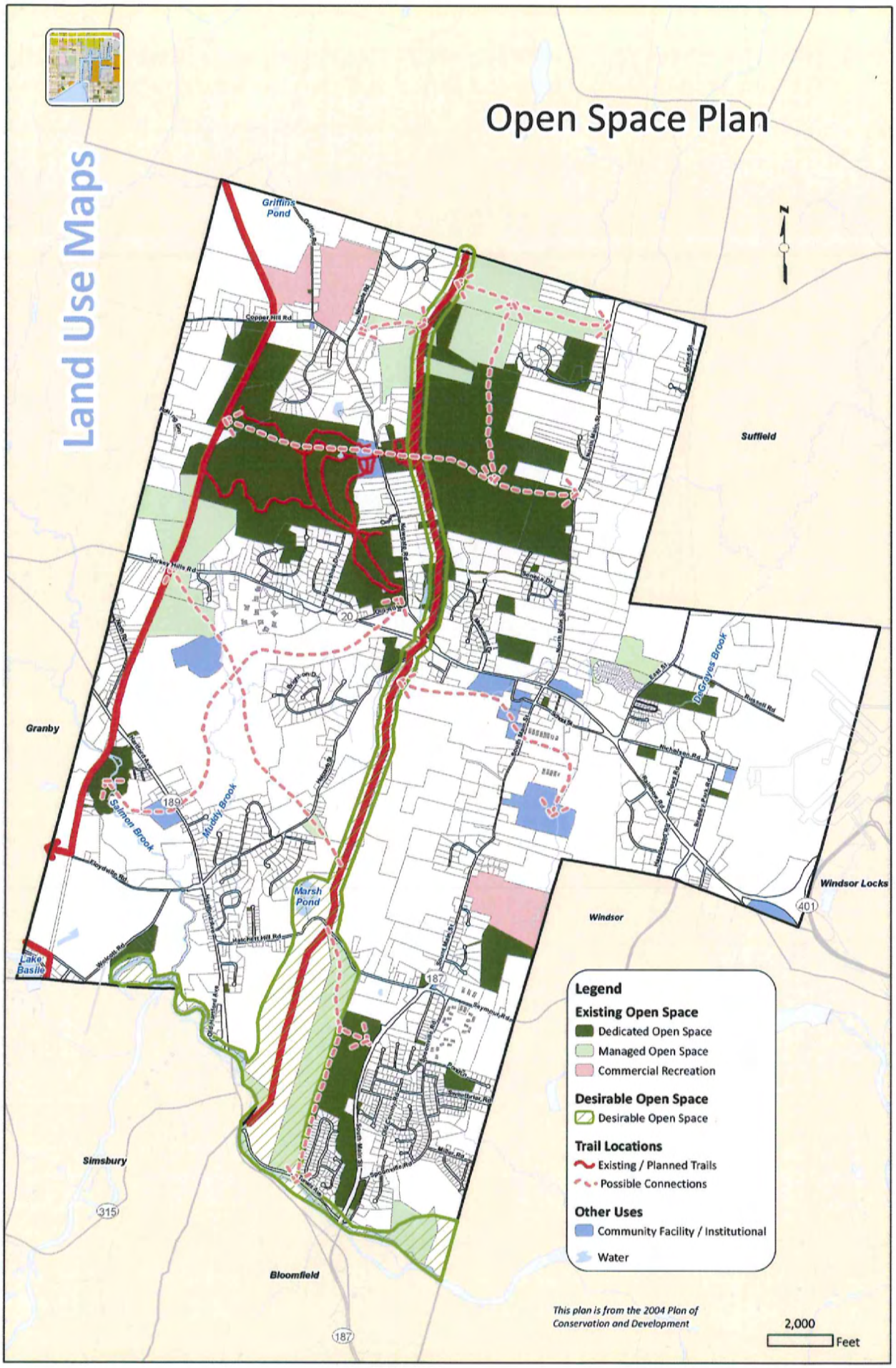
Ridge/Trail Concerns
The so called Metacomet Ridge, known locally as Hatchett Hill, is a visually prominent landscape feature recommended for preservation in various state, regional, and local plans. It is also recognized in the town plan of conservation and development and in a Farmington River Watershed Association study as a key biodiversity area. Similarly, the long established Metacomet Trail along the ridge, part of the Connecticut Forest and Park Association's Blue Trail hiking system, is now part of the New England National Scenic Trail, recognizing its national significance. However, the two larger Galasso ridge holdings between Route 20 and Tariffville Gorge represent the greatest threat to the integrity of the ridge and trail within East Granby.

To address these concerns, two recommendations are offered:

1) There is a need for a town ridge policy to prevent the ridge from being nibbled away, section by section.
2) Establishing a permanent trail easement on the entire Galasso ridge holdings between Route 20 and Tariffville Gorge as a condition of town approval of further quarry expansion.

Site Reclamation/Reuse
Because of its visual prominence and proximity to the town center, the eventual disposition of the quarry area poses a question deserving an answer. Thus, a future reuse plan is needed, unless Galasso intends to maintain its operating industrial plant here indefinitely, using mined material trucked in from elsewhere. A concept plan prepared jointly by the town and the landowner is recommended, as suggested by this reviewer in the 2004 ERT report.

Potential uses may be limited by the Town Plan of Conservation & Development which seems to rule out future industrial, business, office park activity in this locality. Should residential be considered a valid option, if an imaginative site restoration is carried out, using rock walls as attractive scenic features? Another future option for at least part of the former quarry area could be park use, as suggested in the 2004 ERT report comments (See Butchart Gardens, Victoria, British Columbia or Rocky Hill's Quarry Park which, admittedly, lacked proper reclamation).


Land Use Maps
Open Space Plan
N
Griffins Pond
Copper Hill Rd
Suffield
Granby
Salmon Brook
Muddy Brook
Marsh Pond
Lake Basile
DeGraves Brook
Windsor Locks
Windsor
Simsbury
Bloomfield
20
189
187
315
401
Legend
Existing Open Space
Dedicated Open Space
Managed Open Space
Commercial Recreation
Desirable Open Space
Desirable Open Space
Trail Locations
Existing / Planned Trails
Possible Connections
Other Uses
Community Facility / Institutional
Water
This plan is from the 2004 Plan of Conservation and Development
2,000
Feet

Archaeological and Historical Review

The Office of State Archaeology (OSA) had the opportunity to review the southwestern portion of the Galasso Quarry proposed expansion project associated with the historic Smallpox Cemetery. The cemetery has been designated as historically significant to the Town of East Granby. The burying ground is represented by small stone piles, a bordering stone wall and steep embankment. It is understood that a 100 foot buffer adjacent to the smallpox cemetery has been designated as a protection element. This buffer should be adequate in preserving the cemetery. However, if it is feasible to extend the buffer to 150 feet, that might further assure that blasting and other mining activities to not adversely effect the stone structures associated with the cemetery.

Remaining portions of the project area appear to have a low-to-moderate sensitivity for archaeological and historic resources and require no further preservation mechanism.

In summary, culturally sensitive portions of the project area include those associated with the early smallpox cemetery. The proposed 100 foot buffer is adequate; however, we further recommend an expansion of this buffer to 150 feet, to ensure a high degree of preservation.

The Office of State Archaeology is available to provide further technical assistance to Galasso Materials and the Town of East Granby if needed.

(The Simsbury Genealogical and Historical Research Library Summer 2008 Newsletter, Volume 15, Issue 2 contains an article concerning the smallpox cemetery. www.iwwwp.com/sghrl/images/Summer 2008.pdf)

Appendices

Custom Soil Resource Report

Species and Plant Fact Sheets

United States Department of Agriculture

Natural Resources Conservation Service

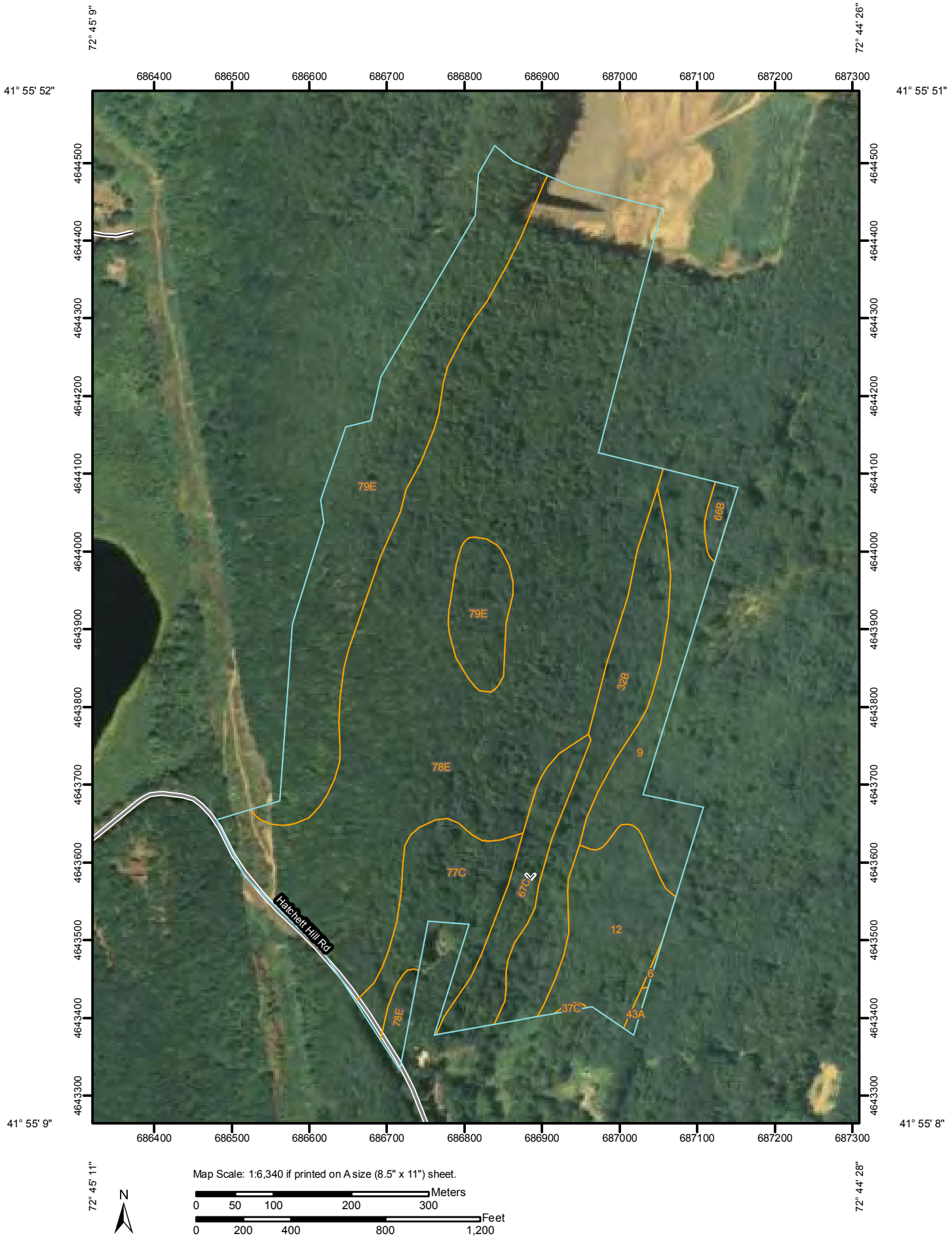
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for State of Connecticut

Galasso Quarry Expansion

November 1, 2012

Soil Map—State of Connecticut
(Galasso Quarry Expansion)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,340 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

Date(s) aerial images were photographed: 8/13/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
6	Wilbraham and Menlo soils, extremely stony	0.1	0.1%
9	Scitico, Shaker, and Maybid soils	7.1	6.3%
12	Raypol silt loam	6.5	5.8%
32B	Haven and Enfield soils, 3 to 8 percent slopes	8.2	7.2%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	0.1	0.1%
43A	Rainbow silt loam, 0 to 3 percent slopes	0.2	0.1%
66B	Narragansett silt loam, 2 to 8 percent slopes	0.6	0.5%
67C	Narragansett silt loam, 8 to 15 percent slopes, very stony	4.1	3.6%
77C	Cheshire-Holyoke complex, 3 to 15 percent slopes, very rocky	6.0	5.3%
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes	59.8	52.9%
79E	Rock outcrop-Holyoke complex, 3 to 45 percent slopes	20.4	18.1%
Totals for Area of Interest		**113.0**	**100.0%**

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

State of Connecticut

Map Unit: 6—Wilbraham and Menlo soils, extremely stony

Component: Wilbraham (60%)

The Wilbraham component makes up 60 percent of the map unit. Slopes are 0 to 3 percent. This component is on depressions on uplands, drainageways on uplands. The parent material consists of coarse-loamy lodgment till derived from basalt and/or sandstone and shale. Depth to a root restrictive layer, densic material, is 20 to 36 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 7s. This soil meets hydric criteria.

Component: Menlo (25%)

The Menlo component makes up 25 percent of the map unit. Slopes are 0 to 3 percent. This component is on depressions on uplands, drainageways on uplands. The parent material consists of coarse-loamy lodgment till derived from basalt and/or sandstone and shale. Depth to a root restrictive layer, densic material, is 20 to 36 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, June, July, August, September, October, November, December. Organic matter content in the surface horizon is about 40 percent. Nonirrigated land capability classification is 7s. This soil meets hydric criteria.

Component: Cheshire (3%)

Generated brief soil descriptions are created for major components. The Cheshire soil is a minor component.

Component: Watchaug (3%)

Generated brief soil descriptions are created for major components. The Watchaug soil is a minor component.

Component: Ludlow (2%)

Generated brief soil descriptions are created for major components. The Ludlow soil is a minor component.

Component: Unnamed, dense substratum (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Unnamed, steep slopes (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Wethersfield (2%)

Generated brief soil descriptions are created for major components. The Wethersfield soil is a minor component.

Component: Unnamed, loam or fine sandy loam surface (1%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Map Unit: 9—Scitico, Shaker, and Maybid soils

Component: Scitico (40%)

The Scitico component makes up 40 percent of the map unit. Slopes are 0 to 3 percent. This component is on depressions on lake plains, drainageways on lake plains, terraces. The parent material consists of clayey glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, April, May, June, October, November, December. Organic matter content in the surface horizon is about 5 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Component: Shaker (30%)

The Shaker component makes up 30 percent of the map unit. Slopes are 0 to 3 percent. This component is on depressions on lake plains, drainageways on lake plains, terraces on lake plains. The parent material consists of coarse-loamy eolian deposits over clayey glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, June, October, November, December. Organic matter content in the surface horizon is about 70 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Component: Maybid (15%)

The Maybid component makes up 15 percent of the map unit. Slopes are 0 to 3 percent. This component is on depressions on lake plains, drainageways on lake plains, terraces on lake plains. The parent material consists of clayey glaciolacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is high. Shrink-swell potential is high. This soil is not flooded. It is occasionally ponded. A seasonal zone of water saturation is at 3 inches during January, February, March, April, May, June, July, August, October, November, December. Organic matter content in the surface horizon is about 7 percent. Nonirrigated land capability classification is 6w. This soil meets hydric criteria.

Component: Brancroft (5%)

Generated brief soil descriptions are created for major components. The Brancroft soil is a minor component.

Component: Elmridge (5%)

Generated brief soil descriptions are created for major components. The Elmridge soil is a minor component.

Component: Unnamed, sand or gravel substratum (3%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Unnamed, red parent material (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Map Unit: 12—Raypol silt loam

Component: Raypol (80%)

The Raypol component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on depressions on outwash plains, drainageways on outwash plains. The parent material consists of coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 5 percent. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Component: Enfield (5%)

Generated brief soil descriptions are created for major components. The Enfield soil is a minor component.

Component: Haven (5%)

Generated brief soil descriptions are created for major components. The Haven soil is a minor component.

Component: Ninigret (3%)

Generated brief soil descriptions are created for major components. The Ninigret soil is a minor component.

Component: Scarboro (2%)

Generated brief soil descriptions are created for major components. The Scarboro soil is a minor component.

Component: Tisbury (2%)

Generated brief soil descriptions are created for major components. The Tisbury soil is a minor component.

Component: Walpole (2%)

Generated brief soil descriptions are created for major components. The Walpole soil is a minor component.

Component: Unnamed, loamy substratum (1%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Map Unit: 32B—Haven and Enfield soils, 3 to 8 percent slopes

Component: Haven (60%)

The Haven component makes up 60 percent of the map unit. Slopes are 3 to 8 percent. This component is on outwash plains on valleys, terraces on valleys. The parent material consists of coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Enfield (25%)

The Enfield component makes up 25 percent of the map unit. Slopes are 3 to 8 percent. This component is on outwash plains on valleys, terraces on valleys. The parent material consists of coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 70 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Agawam (4%)

Generated brief soil descriptions are created for major components. The Agawam soil is a minor component.

Component: Branford (3%)

Generated brief soil descriptions are created for major components. The Branford soil is a minor component.

Component: Ninigret (2%)

Generated brief soil descriptions are created for major components. The Ninigret soil is a minor component.

Component: Raypol (2%)

Generated brief soil descriptions are created for major components. The Raypol soil is a minor component.

Component: Tisbury (2%)

Generated brief soil descriptions are created for major components. The Tisbury soil is a minor component.

Component: Unnamed, gravelly surface (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Map Unit: 37C—Manchester gravelly sandy loam, 3 to 15 percent slopes

Component: Manchester (80%)

The Manchester component makes up 80 percent of the map unit. Slopes are 3 to 15 percent. This component is on eskers on valleys, kames on valleys, outwash plains on valleys, terraces on valleys. The parent material consists of sandy and gravelly glaciofluvial deposits derived from sandstone and shale and/or basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

Component: Hartford (5%)

Generated brief soil descriptions are created for major components. The Hartford soil is a minor component.

Component: Penwood (5%)

Generated brief soil descriptions are created for major components. The Penwood soil is a minor component.

Component: Branford (3%)

Generated brief soil descriptions are created for major components. The Branford soil is a minor component.

Component: Ellington (3%)

Generated brief soil descriptions are created for major components. The Ellington soil is a minor component.

Component: Unnamed, gravelly loamy sand surface (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Unnamed, nongravelly surface (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Map Unit: 43A—Rainbow silt loam, 0 to 3 percent slopes

Component: Rainbow (80%)

The Rainbow component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on drumlins on uplands, hills on uplands. The parent material consists of eolian deposits over coarse-loamy lodgment till derived from gneiss and/or schist and/or sandstone and/or basalt. Depth to a root restrictive layer, densic material, is 20 to 40 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, April, May, November, December. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Broadbrook (5%)

Generated brief soil descriptions are created for major components. The Broadbrook soil is a minor component.

Component: Sutton (5%)

Generated brief soil descriptions are created for major components. The Sutton soil is a minor component.

Component: Ridgebury (3%)

Generated brief soil descriptions are created for major components. The Ridgebury soil is a minor component.

Component: Woodbridge (3%)

Generated brief soil descriptions are created for major components. The Woodbridge soil is a minor component.

Component: Narragansett (2%)

Generated brief soil descriptions are created for major components. The Narragansett soil is a minor component.

Component: Wilbraham (2%)

Generated brief soil descriptions are created for major components. The Wilbraham soil is a minor component.

Map Unit: 66B—Narragansett silt loam, 2 to 8 percent slopes

Component: Narragansett (80%)

The Narragansett component makes up 80 percent of the map unit. Slopes are 2 to 8 percent. This component is on hills on uplands, till plains on uplands. The parent material consists of coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Component: Broadbrook (5%)

Generated brief soil descriptions are created for major components. The Broadbrook soil is a minor component.

Component: Charlton (5%)

Generated brief soil descriptions are created for major components. The Charlton soil is a minor component.

Component: Leicester (3%)

Generated brief soil descriptions are created for major components. The Leicester soil is a minor component.

Component: Canton (2%)

Generated brief soil descriptions are created for major components. The Canton soil is a minor component.

Component: Unnamed, red parent material (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Wapping (2%)

Generated brief soil descriptions are created for major components. The Wapping soil is a minor component.

Component: Sutton (1%)

Generated brief soil descriptions are created for major components. The Sutton soil is a minor component.

Map Unit: 67C—Narragansett silt loam, 8 to 15 percent slopes, very stony

Component: Narragansett (80%)

The Narragansett component makes up 80 percent of the map unit. Slopes are 8 to 15 percent. This component is on hills on uplands, till plains on uplands. The parent material consists of coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Broadbrook (5%)

Generated brief soil descriptions are created for major components. The Broadbrook soil is a minor component.

Component: Canton (5%)

Generated brief soil descriptions are created for major components. The Canton soil is a minor component.

Component: Charlton (3%)

Generated brief soil descriptions are created for major components. The Charlton soil is a minor component.

Component: Wapping (3%)

Generated brief soil descriptions are created for major components. The Wapping soil is a minor component.

Component: Leicester (2%)

Generated brief soil descriptions are created for major components. The Leicester soil is a minor component.

Component: Sutton (2%)

Generated brief soil descriptions are created for major components. The Sutton soil is a minor component.

Map Unit: 77C—Cheshire-Holyoke complex, 3 to 15 percent slopes, very rocky

Component: Cheshire (45%)

The Cheshire component makes up 45 percent of the map unit. Slopes are 3 to 15 percent. This component is on hills on uplands, till plains on uplands. The parent material consists of coarse-loamy melt-out till derived from basalt and/or sandstone and shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Holyoke (35%)

The Holyoke component makes up 35 percent of the map unit. Slopes are 3 to 15 percent. This component is on hills on uplands, ridges on uplands. The parent material consists of loamy eolian deposits over melt-out till derived from basalt and/or sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 70 percent. Nonirrigated land capability classification is 6s. This soil does not meet hydric criteria.

Component: Yalesville (10%)

Generated brief soil descriptions are created for major components. The Yalesville soil is a minor component.

Component: Rock outcrop (6%)

Generated brief soil descriptions are created for major components. The Rock outcrop soil is a minor component.

Component: Menlo (1%)

Generated brief soil descriptions are created for major components. The Menlo soil is a minor component.

Component: Watchaug (1%)

Generated brief soil descriptions are created for major components. The Watchaug soil is a minor component.

Component: Wethersfield (1%)

Generated brief soil descriptions are created for major components. The Wethersfield soil is a minor component.

Component: Wilbraham (1%)

Generated brief soil descriptions are created for major components. The Wilbraham soil is a minor component.

Map Unit: 78E—Holyoke-Rock outcrop complex, 15 to 45 percent slopes

Component: Holyoke (50%)

The Holyoke component makes up 50 percent of the map unit. Slopes are 15 to 45 percent. This component is on hills on uplands, ridges on uplands. The parent material consists of loamy eolian deposits over melt-out till derived from basalt and/or sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 70 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Rock outcrop (25%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Component: Cheshire (5%)

Generated brief soil descriptions are created for major components. The Cheshire soil is a minor component.

Component: Menlo (5%)

Generated brief soil descriptions are created for major components. The Menlo soil is a minor component.

Component: Wethersfield (5%)

Generated brief soil descriptions are created for major components. The Wethersfield soil is a minor component.

Component: Yalesville (5%)

Generated brief soil descriptions are created for major components. The Yalesville soil is a minor component.

Component: Unnamed, Very shallow soils (3%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Unnamed, less sloping (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Map Unit: 79E—Rock outcrop-Holyoke complex, 3 to 45 percent slopes

Component: Rock outcrop (55%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop is a miscellaneous area.

Component: Holyoke (25%)

The Holyoke component makes up 25 percent of the map unit. Slopes are 3 to 45 percent. This component is on hills on uplands, ridges on uplands. The parent material consists of loamy eolian deposits over melt-out till derived from basalt and/or sandstone and shale. Depth to a root restrictive layer, bedrock, lithic, is 10 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 70 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

Component: Wethersfield (5%)

Generated brief soil descriptions are created for major components. The Wethersfield soil is a minor component.

Component: Yalesville (5%)

Generated brief soil descriptions are created for major components. The Yalesville soil is a minor component.

Component: Cheshire (3%)

Generated brief soil descriptions are created for major components. The Cheshire soil is a minor component.

Component: Menlo (3%)

Generated brief soil descriptions are created for major components. The Menlo soil is a minor component.

Component: Unnamed, steep slopes (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Component: Unnamed, very shallow soils (2%)

Generated brief soil descriptions are created for major components. The Unnamed soil is a minor component.

Data Source Information

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Fact Sheet

DILLENIUS' TICK-TREFOIL

Desmodium glabellum Michx

Plant symbol = DEGL4

Contributed by: USDA NRCS Plant Materials Program

David G. Smith, copyright 1997-2009
www.delawarewildflowers.org

Alternate Names
Panicle tick-trefoil, perplexed tick-trefoil, tall tick clover, Diclinous' tick-trefoil (Connecticut), smooth tick-trefoil

Uses
The seeds of the Dillenius' Tick-Trefoil are eaten by upland game birds, small rodents, wild turkey, rabbits, groundhogs and livestock. It is also an excellent deer browse.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status (e.g. threatened or endangered species, stae noxious status, and wetland indicator value.)

Description
Dillenius' tick trefoil is a member of the pea family. This native perennial forb grows between 2 ½ to 5 feet in height. Its tiny flowers are pink or purple and irregular in shape and have no floral scent. The flowers turn light blue when spent. Bloom time is from mid-summer to early fall and lasts about a month. The leaves are alternate, composed of three entire leaflets. They are egg shaped with little or no point. There is little or no stipule where the leaf is attached to the stem. The seed pods are covered with tiny hooked hairs that enable them to stick to the fur of passing animals and the fabric of humans, thus providing a mechanism for dispersal. Long tongued bees are the primary pollinators.

Adaptation and Distribution
This tick trefoil prefers partial sun and dry to slightly dry conditions. It usually grows in soil that contains loam, clay-loam, or some kind of rocky material. Its habitats include savannas, rocky upland forest, edges of wooded areas, thickets, and limestone glades. Its range is from New England to Minnesota and from Florida to Texas. It is common throughout the Midwest States.
For a current distribution map, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
A clean, firm seedbed is essential for establishing Dillenius' Tick-Trefoil. A good seedbed can be prepared by disking and harrowing, following by cultipacking. Planting into no-till conditions can be effective provided weeds are controlled and residue is managed prior to planting. Good seed-to-soil contact is important for germination and establishment.

The seedbed should be firm enough to allow the seed to be planted ⅛" to ¼" deep. Cultipacker seeders and band seeders followed by press wheels or a cultipacker help ensure shallow seed placement and good seed-to-soil contact. Apply fertilizer (especially phosphorus or potassium) only as recommended by a soil test. Nitrogen fertilizer is not recommended during establishment year.

Inoculating seeds with *Rhizobium* before planting is recommended. Consult inoculant supplier for recommendations on specific *Rhizobium* strains for Dillenius' tick-trefoil.

Seeding rates for Dillenius' Tick-Trefoil should be 2 to 4 oz. pure live seed per acre for wildlife planting or 0.5 to 10% of a mix for prairie restoration. Seed can be planted in the spring or early fall.

Management
Reduce weed competition by mowing at a height that will not affect the tick-trefoil seedlings. For grassy weed control use a grass herbicide and follow label

recommendation, as weed control will encourage a good stand. Note: Some herbicide products may not be registered on this legume species in your state.

Pests and Potential Problems
Japanese beetle adults feed on flowers and leaves. White mold has been observed on some *Desmodium* species.

Environmental Concerns
Dillenius' tick trefoil is on the special concern list in Connecticut.

Cultivars, Improved, and Selected Materials (and area of origin)
Alcona Germplasm Dillenius' tick-trefoil is a tested class release from the Rose Lake Plant Materials Center in East Lansing, Michigan. It was collected from native stands in Alcona County, MI and released in 2006.
Marion Germplasm Dillenius' tick-trefoil is a selected class release from the Rose Lake Plant Materials Center in East Lansing, MI. It was collected from native stands in Marion County, IL and released in 2009.

Prepared By: *USDA-NRCS Rose Lake Plant Materials Center, East Lansing, Michigan*

Species Coordinator:
John W. Leif, Manager
Rose Lake Plant Materials Center, East Lansing, MI

Control
Please contact your local agricultural extension specialist or county weed specialist to learn what works best in your area and how to use it safely. Always read label and safety instructions for each
Control method. Trade names and control measures appear in this document only to provide specific information. USDA, NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

References

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Published September 2009

Edited: [e.g., 08Sep2009 rg, 08Sep2009 jfh; 17Sep2009 jfe]

For more information about this and other plants, please contact your local NRCS field office or Conservation District <http://www.nrcs.usda.gov/>, and visit the PLANTS Web site <http://plants.usda.gov> or the Plant Materials Program Web site <http://plant-materials.nrcs.usda.gov>

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Natural Resources Conservation Service

NRCS | PLANTS Database

PLANTS Profile

Salix pedicellaris Pursh
bog willow

Symbol:	SAPE2
Group:	Dicot
Family:	Salicaceae
Duration:	Perennial
Growth Habit:	Shrub
Native Status:	L48 N CAN N SPM N

©Susan McDougall. Trees Live Here. United States, WA, Mount Adams, Babyshoe Meadow, 1295 m. June 25, 2004.

More Information:

Classification Report
Data Source and Documentation
Large Photograph
High-resolution Photograph in JPEG Format

Images:

Salix pedicellaris Pursh. More than one image is available in the PLANTS Image Gallery. Click on the thumbnail(s) below to view other versions of this printer-friendly PLANTS profile with a full-sized image and a high-resolution publication image (when available).

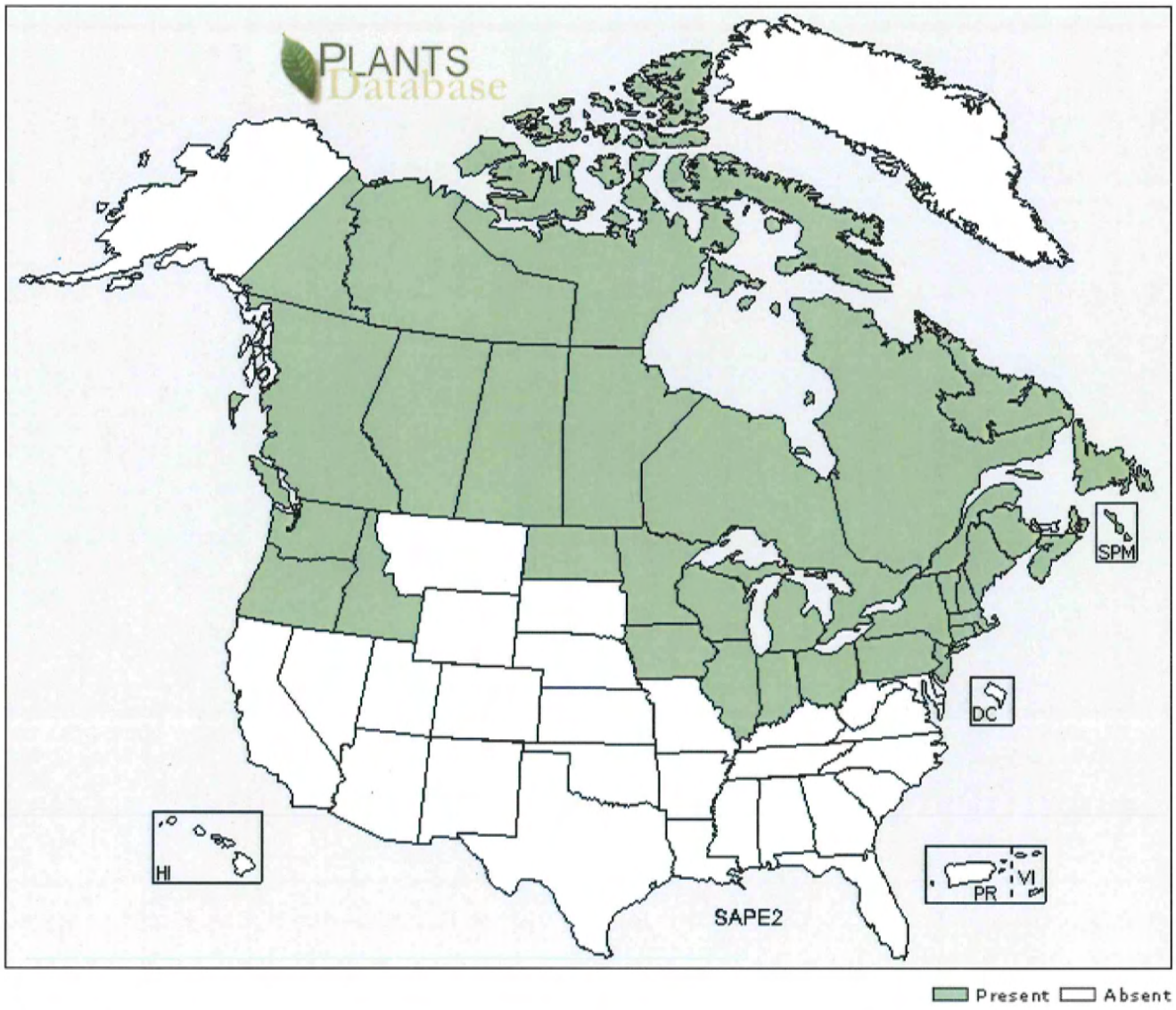
Synonyms:

Salix pedicellaris Pursh

SAFUH *Salix fuscescens* Andersson var. *hebecarpa* Fernald
SAHE4 *Salix hebecarpa* (Fernald) Fernald
SAMYH *Salix myrtilloides* L. var. *hypoglauca* (Fernald) C.R. Ball

SAMYP3 *Salix myrtilloides* L. var. *pedicellaris* (Pursh) Andersson
SAPEH *Salix pedicellaris* Pursh var. *hypoglauca* Fernald
SAPET2 *Salix pedicellaris* Pursh var. *tenuescens* Fernald

Distribution by State:
Salix pedicellaris Pursh



Salix pedicellaris Pursh distribution:
USA (CT, IA, ID, IL, IN, MA, ME, MI, MN, ND, NH, NJ, NY, OH, OR, PA, RI, VT, WA, WI), **CAN** (AB, BC, LB, MB, NB, NF, NS, NT, NU, ON, QC, SK, YT), **FRA** (SPM)

County distributions for the following U.S. states are available at PLANTS:
CT, ID, IL, IN, MA, ME, MI, MN, NH, NJ, NY, OH, OR, VT, WA, WI

Related Taxa:
Salix pedicellaris Pursh

2 genera in Salicaceae, 170 species in *Salix*

Classification:

Salix pedicellaris Pursh

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Dilleniidae*
Order	*Salicales*
Family	*Salicaceae* – Willow family
Genus	*Salix* L. – willow
Species	*Salix pedicellaris* Pursh – bog willow

Threatened and Endangered Information:

Salix pedicellaris Pursh

This plant is listed by the U.S. federal government or a state. Common names are from state and federal lists.

Connecticut:
bog willow Endangered
Iowa:
bog willow Threatened
New Jersey:
bog willow Endangered
Ohio:
bog willow Endangered
Pennsylvania:
bog-willow Endangered
Rhode Island:
bog willow Historical

Wetland Indicator Status:

Salix pedicellaris Pursh

Nat. Ind.	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8	Reg. 9	Reg. 0	Reg. A	Reg. C	Reg. H
UPL,OBL	OBL	NO	OBL	NI	NO	NO	NO	NO	OBL	NO	UPL	NO	NO

Integrated Taxonomic Information Sytem (ITIS) :

Salix pedicellaris Pursh

ITIS Taxonomic Serial Number 22564.

Time Generated: 01/10/2013 02:03 PM CST

Close Window

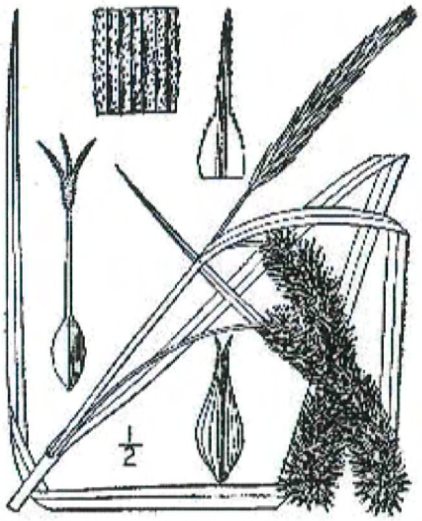
USDA United States Department of Agriculture
Natural Resources Conservation Service

NRCS | PLANTS Database

PLANTS Profile

Carex pseudocyperus L.
cypress-like sedge

Symbol:	CAPS
Group:	Monocot
Family:	Cyperaceae
Duration:	Perennial
Growth Habit:	Graminoid
Native Status:	L48 N CAN N

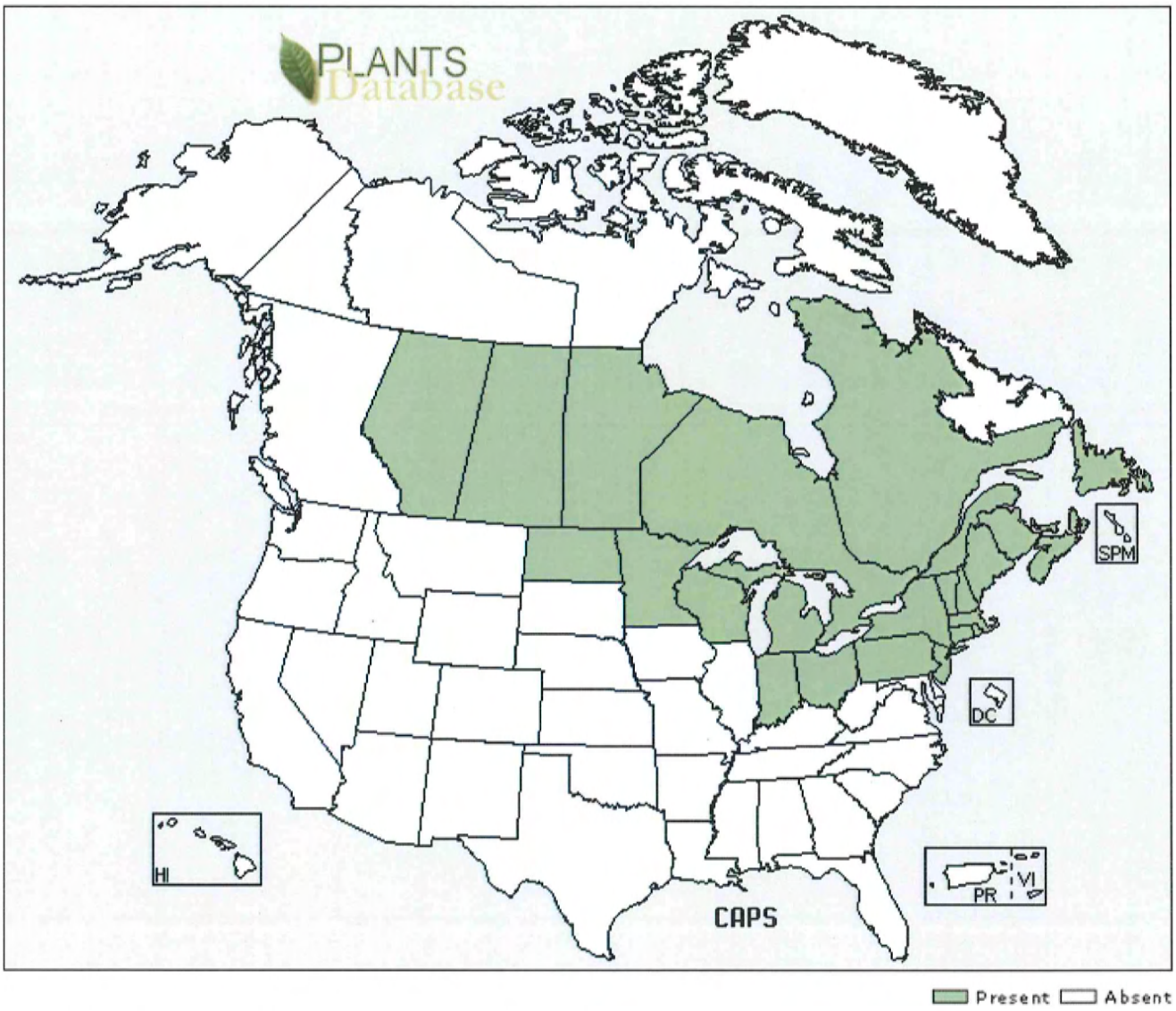


Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 1: 437. Courtesy of Kentucky Native Plant Society. Scanned by Omnitek Inc.

More Information:

Classification Report
Data Source and Documentation
Large Line Drawing
High-resolution Line Drawing in TIFF Format

Distribution by State:
Carex pseudocyperus L.



Carex pseudocyperus L. distribution:
USA (CT, IN, MA, ME, MI, MN, ND, NH, NJ, NY, OH, PA, RI, VT, WI), **CAN** (AB, MB, NB, NF, NS, ON, PE, QC, SK)

County distributions for the following U.S. states are available at PLANTS:
CT, IN, MA, ME, MI, MN, ND, NH, NJ, NY, OH, PA, RI, VT, WI

Related Taxa:

Carex pseudocyperus L.

36 genera in Cyperaceae, 589 species in *Carex*

Classification:

Carex pseudocyperus L.

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Liliopsida* – Monocotyledons

Subclass	*Commelinidae*
Order	*Cyperales*
Family	*Cyperaceae* – Sedge family
Genus	*Carex* L. – sedge
Species	*Carex pseudocyperus* L. – cypress-like sedge

Threatened and Endangered Information:

Carex pseudocyperus L.

This plant is listed by the U.S. federal government or a state. Common names are from state and federal lists.

Connecticut:	
cyperus-like sedge	Endangered
Indiana:	
cyperus-like sedge	Endangered
New Jersey:	
cyperus-like sedge	Endangered
Ohio:	
northern bearded sedge	Endangered
Pennsylvania:	
cyperus-like sedge	Endangered

Wetland Indicator Status:

Carex pseudocyperus L.

Nat. Ind.	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8	Reg. 9	Reg. 0	Reg. A	Reg. C	Reg. H
OBL	OBL	NO	OBL	OBL	NO	NO	NO	NO	NO	NO	NO	NO	NO

Integrated Taxonomic Information Sytem (ITIS) :

Carex pseudocyperus L.

ITIS Taxonomic Serial Number 39462.

Time Generated: 01/10/2013 02:07 PM CST

Close Window

USDA United States Department of Agriculture
Natural Resources Conservation Service

NRCS | PLANTS Database

PLANTS Profile

Triosteum angustifolium L.
yellowfruit horse-gentian

Symbol:	TRAN3
Group:	Dicot
Family:	Caprifoliaceae
Duration:	Perennial
Growth Habit:	Forb/herb
Native Status:	L48 N CAN N

Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 3: 275. Courtesy of Kentucky Native Plant Society. Scanned by Omnitek Inc.

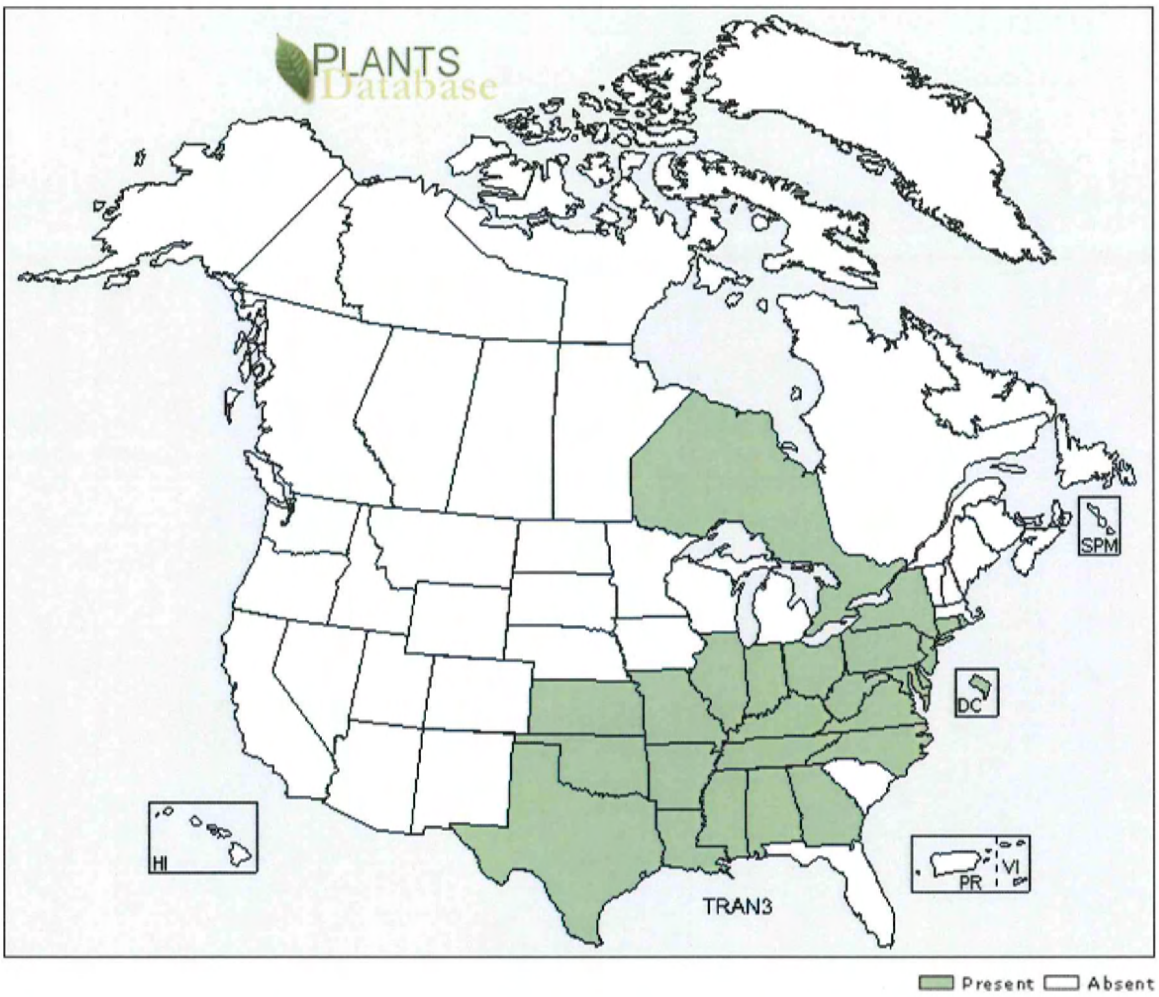
More Information:

Classification Report
Data Source and Documentation
Large Line Drawing
High-resolution Line Drawing in TIFF Format

Synonyms:
Triosteum angustifolium L.

TRANE *Triosteum angustifolium* L. var. *eamesii* Wiegand

Distribution by State:
Triosteum angustifolium L.



Triosteum angustifolium L. distribution:
USA (AL, AR, CT, DC, DE, GA, IL, IN, KS, KY, LA, MD, MO, MS, NC, NJ, NY, OH, OK, PA, RI, TN, TX, VA, WV), **CAN** (ON)

County distributions for the following U.S. states are available at PLANTS:
AL, AR, CT, DC, DE, GA, IL, IN, KS, KY, LA, MO, MS, NC, NJ, NY, OH, PA, TN, TX, VA, WV

Related Taxa:

Triosteum angustifolium L.

11 genera in Caprifoliaceae, 3 species in *Triosteum*

Classification:

Triosteum angustifolium L.

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Asteridae*
Order	*Dipsacales*
Family	*Caprifoliaceae* – Honeysuckle family
Genus	*Triosteum* L. – horse-gentian
Species	*Triosteum angustifolium* L. – yellowfruit horse-gentian

Threatened and Endangered Information:

Triosteum angustifolium L.

This plant is listed by the U.S. federal government or a state. Common names are from state and federal lists.

Connecticut:		
	narrow-leaved horse gentian	Special Concern
Maryland:		
	narrow-leaved horse-gentian	Endangered
New Jersey:		
	narrow-leaf horse-gentian	Endangered
Pennsylvania:		
	horse-gentian	Endangered

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United States Department of Agriculture
Natural Resources Conservation Service

NRCS | PLANTS Database

PLANTS Profile

Potentilla arguta Pursh
tall cinquefoil

Symbol:	POAR7		
Group:	Dicot		
Family:	Rosaceae		
Duration:	Perennial		
Growth Habit:	Subshrub Forb/herb		
Native Status:		L48	N
		AK	N
		CAN	N

Robert Tatina. USDA NRCS. 1992. *Western wetland flora: Field office guide to plant species*. West Region, Sacramento. Courtesy of USDA NRCS Wetland Science Institute.

More Information:

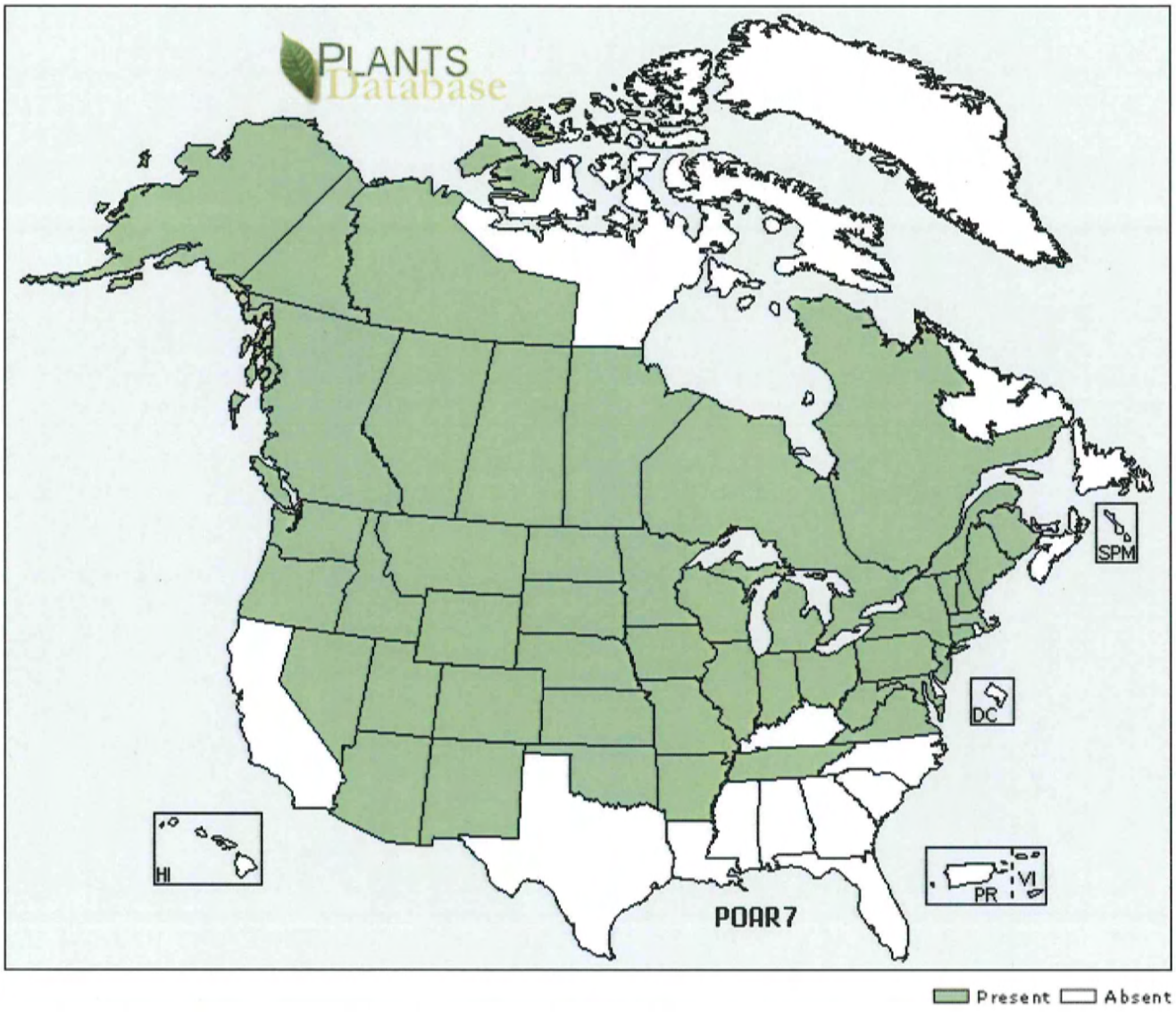
Characteristics Report
Classification Report
Data Source and Documentation
Large Photograph
High-resolution Photograph in JPEG Format

Images:

Potentilla arguta Pursh. More than one image is available in the PLANTS Image Gallery. Click on the thumbnail(s) below to view other versions of this printer-friendly PLANTS profile with a full-sized image and a high-resolution publication image (when available).

Distribution by State:

Potentilla arguta Pursh



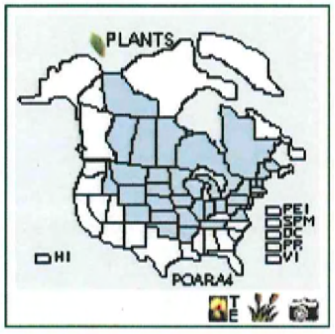
Potentilla arguta Pursh distribution:
USA (AK, AR, AZ, CO, CT, IA, ID, IL, IN, KS, MA, MD, ME, MI, MN, MO, MT, ND, NE, NH, NJ, NM, NV, NY, OH, OK, OR, PA, SD, TN, UT, VA, VT, WA, WI, WV, WY), **CAN** (AB, BC, MB, NB, NT, ON, QC, SK, YT)

County distributions for the following U.S. states are available at PLANTS:
AK, AR, AZ, CO, CT, IA, ID, IL, IN, KS, MA, ME, MI, MN, MO, MT, ND, NE, NH, NJ, NV, NY, OH, OK, OR, PA, SD, UT, VA, VT, WA, WI, WY

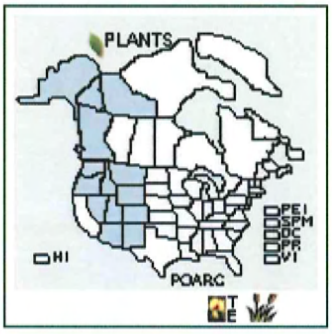
Related Taxa:

Potentilla arguta Pursh

72 genera in Rosaceae, 84 species in *Potentilla*



Potentilla arguta ssp. *arguta*
tall cinquefoil



Potentilla arguta ssp. *convallaria*
cream cinquefoil

Native Introduced
Noxious Threatened and Endangered Wetland Image

Classification:

Potentilla arguta Pursh

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Rosidae*
Order	*Rosales*
Family	*Rosaceae* – Rose family
Genus	*Potentilla* L. – cinquefoil
Species	*Potentilla arguta* Pursh – tall cinquefoil

Threatened and Endangered Information:

Potentilla arguta Pursh

This plant is listed by the U.S. federal government or a state. Common names are from state and federal lists.

Arkansas:
tall cinquefoil Threatened
Connecticut:
tall cinquefoil Special Concern
Ohio:
tall cinquefoil Endangered

Wetland Indicator Status:

Potentilla arguta Pursh

Nat. Ind.	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8	Reg. 9	Reg. 0	Reg. A	Reg. C	Reg. H
UPL,FACU+	UPL	NI	FACU-	FACU	FACU	FACU+	FACU	FACU	FACU	NO	FACU	NO	NO

Integrated Taxonomic Information Sytem (ITIS) :

Potentilla arguta Pursh

ITIS Taxonomic Serial Number 24692.

Time Generated: 01/10/2013 02:57 PM CST

Close Window

USDA United States Department of Agriculture
Natural Resources Conservation Service

NRCS | PLANTS Database

PLANTS Profile

Acalypha virginica L.
Virginia threeseed mercury

Symbol: ACVI
Group: Dicot
Family: Euphorbiaceae
Duration: Annual
Growth Habit: Forb/herb
Native Status: L48 N

Robert H. Mohlenbrock. USDA SCS. 1991. *Southern wetland flora: Field office guide to plant species.* South National Technical Center, Fort Worth. Courtesy of USDA NRCS Wetland Science Institute.

More Information:

Characteristics Report
Classification Report
Data Source and Documentation
Large Photograph
High-resolution Photograph in JPEG Format

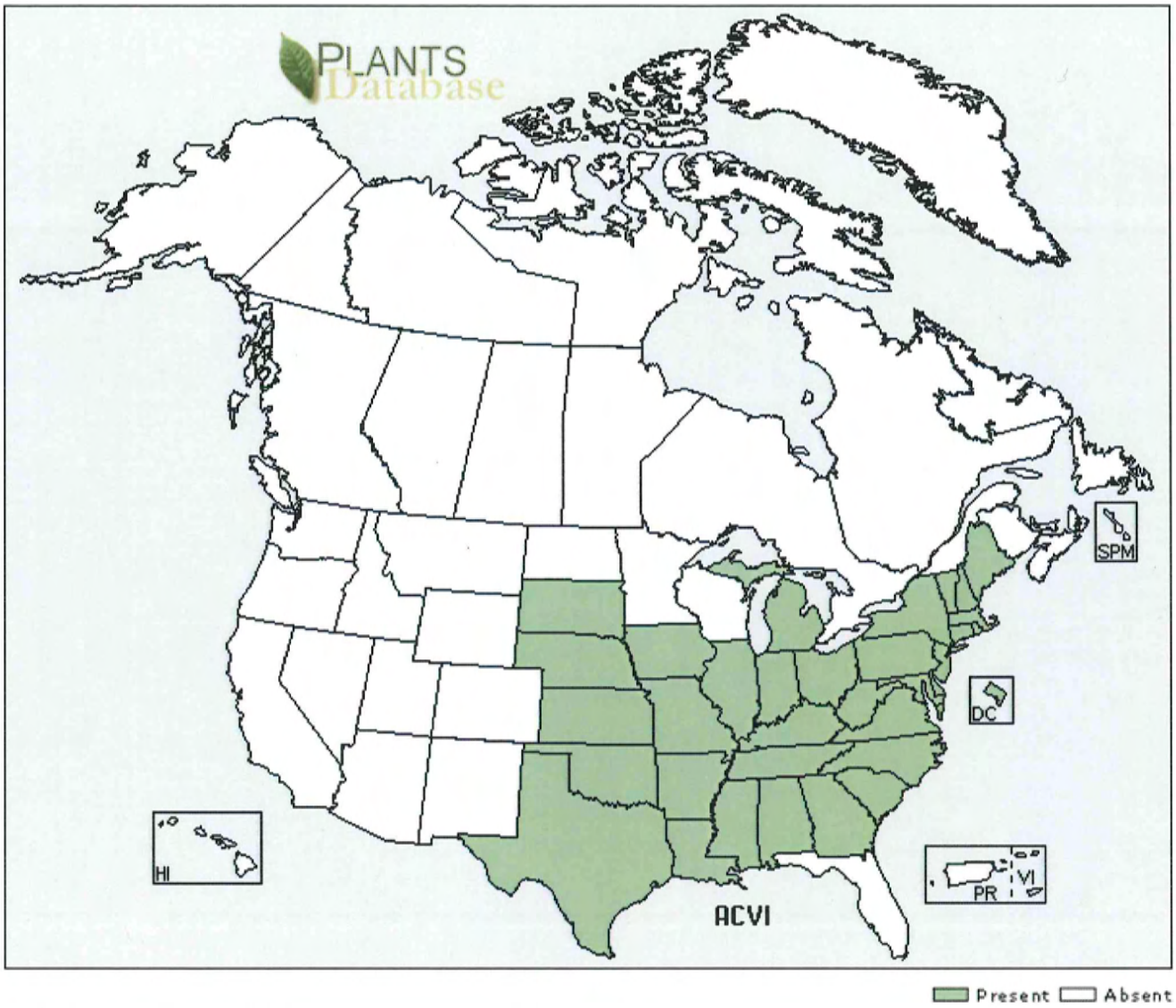
Images:

Acalypha virginica L. More than one image is available in the PLANTS Image Gallery. Click on the thumbnail(s) below to view other versions of this printer-friendly PLANTS profile with a full-sized image and a high-resolution publication image (when available).




Distribution by State:

Acalypha virginica L.



Acalypha virginica L. distribution:
USA (AL, AR, CT, DC, DE, GA, IA, IL, IN, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, NE, NH, NJ, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WV)

County distributions for the following U.S. states are available at PLANTS:
AL, AR, CT, DC, DE, GA, IA, IL, IN, KS, KY, LA, MA, ME, MI, MO, MS, NC, NE, NH, NJ, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WV

Related Taxa:

Acalypha virginica L.

60 genera in Euphorbiaceae, 23 species in *Acalypha*

Classification:

Acalypha virginica L.

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants

Class	*Magnoliopsida* – Dicotyledons
Subclass	*Rosidae*
Order	*Euphorbiales*
Family	*Euphorbiaceae* – Spurge family
Genus	*Acalypha* L. – copperleaf
Species	*Acalypha virginica* L. – Virginia threeseed mercury

Threatened and Endangered Information:

Acalypha virginica L.

This plant is listed by the U.S. federal government or a state. Common names are from state and federal lists.

Connecticut:	
Virginia copperleaf	Special Concern
Maine:	
three-seeded mercury	Possibly Extirpated
New Hampshire:	
three-seeded mercury	Threatened
New York:	
Virginia three-seeded mercury	Endangered

U.S. Weed Information:

Acalypha virginica L.

Virgina threeseed mercury
Virginia copperleaf
mercuryweed
threeseeded mercury
wax balls

This plant can be weedy or invasive according to the authoritative sources noted below. This plant may be known by one or more common names in different places, and some are listed above.

N'EAST Uva, R.H., J.C. Neal, & J.M. DiTomaso. 1997. *Weeds of the Northeast*. Cornell University Press. Ithaca, New York.

SWSS Southern Weed Science Society. 1998. *Weeds of the United States and Canada. CD-ROM*. Southern Weed Science Society. Champaign, Illinois.

Wetland Indicator Status:

Acalypha virginica L.

Nat. Ind.	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6	Reg. 7	Reg. 8	Reg. 9	Reg. 0	Reg. A	Reg. C	Reg. H
UPL,FACU	FACU-	FACU-	FACU	FACU-	FACU-	UPL*	NO	NO	NO	NO	NO	NI*	NO

Integrated Taxonomic Information Sytem (ITIS) :

Acalypha virginica L.

ITIS Taxonomic Serial Number 28195.

Time Generated: 01/10/2013 03:05 PM CST

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Connecticut Department of Energy & Environmental Protection

Jefferson Salamander Complex

(Ambystoma jeffersonianum complex)

IDENTIFICATION: Slender, wide head, long toes, brown coloration with silvery foxing on the sides of the body and legs. Tail flattened laterally. Medium to large size, adults 130-170 mm total length.

This salamander occurs west of the Connecticut River where it is localized in the upland areas of Litchfield County and northern Fairfield County. A second center of distribution is along the trap rock ridge system of the Central Connecticut Lowland. This salamander is very sensitive to habitat disturbance and fragmentation, and is undergoing a range-wide decline (Bogart and Klemens, 1997). It breeds in vernal pools and requires extensive tracts of forest surrounding these pools to survive. In Connecticut, the most vulnerable populations are those associated with the trap rock ridge system, with at least one well known population at Foxon, near New Haven, now extinct. Populations in Fairfield, New Haven, and Hartford Counties have also been severely reduced and stressed by habitat fragmentation.

Salamanders | Amphibians and Reptiles in Connecticut

About the Team

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, foresters, soil specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area — an 86 town region.*

The services of the Team are available as a public service at no cost to Connecticut towns.

Purpose of the Team
The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, landfills, commercial and industrial developments, sand and gravel excavations, active adult, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

Requesting a Review
Environmental reviews may be requested by the chief elected official of a municipality and/or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the chairman of your local Conservation District and the ERT Coordinator. A request form should be completely filled out and should include the required materials. When this request is reviewed by the local Conservation District and approved by the ERT Subcommittee, the Team will undertake the review on a priority basis.

For additional information and request forms regarding the Environmental Review Team please contact the ERT Coordinator: 860-345-3977, Eastern Connecticut RC&D Area, P.O. Box 70, Haddam, Connecticut 06438, e-mail: connecticutert@aol.com.

About the Eastern Connecticut RC&D Area

Resource Conservation and Development (RC&D) is a program of the United States Department of Agriculture (USDA). The Secretary of Agriculture gave the Natural Resources Conservation Service (NRCS) [formerly the Soil Conservation Service] responsibility for administering the program. RC&D is unique because it is led by local volunteer councils that help people care for and protect their natural resources in a way that improves the local economy, environment, and living standards. RC&D is a way for people to work together to plan and carry out activities that will make their area a better place in which to live.

Interest in creating the Eastern Connecticut RC&D Area first started in 1965. An application for assistance was prepared and submitted in June 1967 to the Secretary of Agriculture for planning authorization. This authorization was received in August 1968. In 1983, an application by the Eastern Connecticut RC&D's Executive Council was approved by USDA and NRCS to enlarge the area to an 86 town region.

The focus of the Eastern Connecticut RC&D Program is to help people care for and protect their natural resources, improve local economies, and sustain a high quality of life. The program derives its success from its ability to connect individuals, communities, government entities, and grassroots organizations. These connections and partnerships enable the development of shared visions and resource networks that work toward a healthy future for Connecticut. Current members on the RC&D Council represent the Working Lands Alliance, the Essex Land Trust, The Last Green Valley, the Green Valley Institute, the Thames River Basin Partnership, WINCOG, SECCCOG, NECCOG, CRERPA, NorthCentral Conservation District, Eastern Conservation District and the CT River and Estuary Conservation District.

For more information please visit their website at: www.easternrcd-ct.org.