



Environment

Prepared for:  
Connecticut Department of Energy  
& Environmental Protection

Prepared by:  
AECOM  
Pocasset, MA 02559  
Project No.: 60306709

# 2014 Rare Plant Survey Report

**Tennessee Gas Pipeline Company, LLC**

**Connecticut Expansion Project**

**Suffield to East Granby (Hartford County), Connecticut**

**CT NDDDB Determination No.: 201304121**





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# 2014 Rare Plant Survey Report

A handwritten signature in black ink that reads "Donald Schall".

Prepared By: Donald G. Schall

A handwritten signature in black ink that reads "O'Sullivan".

Reviewed By: Timothy O'Sullivan



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## 1.0 Introduction

This 2014 Rare Plant Survey Report has been prepared on behalf of the Tennessee Gas Pipeline Company, LLC in reference to the Connecticut Expansion Project (the “Project”) for the construction of a proposed looping natural gas pipeline including approximately 8.1 miles in Connecticut. The subject component of the Project originates in the Town of Agawam (Hamden County), Massachusetts and crosses into central Connecticut into the Town of Suffield and terminates in the Town of East Granby (Hartford County), Connecticut (Appendix A, Site Locus Map). This report discusses those areas of the Project where targeted rare plants surveys were performed by AECOM for Connecticut state-listed plant species.

The purpose of this report is to provide information on the potential presence and distribution of state-listed rare plant species within and adjacent to the Project limits in response to the consultation letter received from the Connecticut Department of Energy & Environmental Protection (“CT DEEP”). In correspondence dated November 23, 2013, the Connecticut Natural Diversity Data Base (“CT NDDDB”) of the CT DEEP provided the project proponent with information on the potential presence of state-listed rare plant species known or thought to occur within the project limits (Appendix B). According to the CT NDDDB correspondence, no Federally-listed plant species are reported to occur within the project limits.

State protected native plant species reported to occur within the project limits include Low Frostweed (*Crocianthemum propinquum* = *Helianthemum propinquum*), a state “threatened” species, and three state “special concern” species: Bush’s Sedge (*Carex bushii*), Squarrose Sedge (*Carex squarrosa*), and New England Grape (*Vitis x novae-angliae*).

This Rare Plant Survey Report summarizes the results of targeted botanical surveys performed in June, July, and September, 2014 during the flowering and fruiting periods for the state-listed rare plant species.

## 2.0 Survey Methodology

AECOM initiated consultation with CT DEEP in November of 2013 for information on state-listed plant species or sensitive natural communities known to occur near or in proximity to the proposed activities in the existing pipeline corridor. The CT NDDDB response letter provided information on the potential occurrence of four state-listed rare plant species known to occur within the project limits (Appendix B). In response to the CT NDDDB letter, botanical surveys were performed by AECOM botanists with field survey experience in the New England region to determine the presence or absence of state-listed rare plants within the proposed work areas within the rare plant and wildlife polygons identified by CT NDDDB. Field surveys were performed to coincide with the early flowering and fruiting periods for the state-listed rare plant species. Federally protected plant species were not reported by CT NDDDB within the proposed project limits.

AECOM researched publicly-available documents pertaining to state-listed rare plant species potentially occurring within the project limits. Telephone and electronic conversations with the state

botanist were initiated prior to the field surveys to focus the survey effort. Regional botanical references were consulted prior to and during the field surveys. Meander surveys and linear transects were performed by AECOM botanists in areas of suitable habitat in the CT NDDDB polygons where the existing pipeline corridor crossed an identified polygon. The botanical surveys were performed at the appropriate time of the year for identification of the targeted species in the early to mid flowering and fruiting periods for the state-listed rare plant species. Field surveys were performed on June 17 and 18, 2014, July 8, 2014 and September 3, 2014 under favorable weather conditions. A Global Positioning System (GPS) was used during the field surveys to confirm the location of rare plant populations observed in the surveys. Plant communities recorded in the CT NDDDB areas investigated were photo-documented during the field surveys and are included in Appendix C. Subsequent to state-listed plant identification confirmation, information on the surrounding plant community was collected to prepare a CT Rare Plant Survey Form (Appendix D).

### 3.0 CT Natural Diversity Data Base Areas Rare Plant Species

State-listed rare plant species reported to potentially occur within the Project limits as indicated in the November 23, 2013 letter from CT NDDDB are summarized below in Table 1.

**Table 1 – State-listed Rare Species Potentially Occurring within the Project Limits**

Connecticut State-Listed Plant Species			
Scientific Name	Common Name	Taxonomic Group	State Status
<i>Crocianthemum propinquum</i>	Low Frostweed	Vascular Plant	Threatened
<i>Carex bushii</i>	Bush's Sedge	Vascular Plant	Special Concern
<i>Carex squarrosa</i>	Squarrose Sedge	Vascular Plant	Special Concern
<i>Vitis x novae-angliae</i>	New England Grape	Vascular Plant	Special Concern

State status is from the current CT DEEP list of Endangered, Threatened, and Special Concern Plants (CT DEEP 2014). Vascular plant taxonomy, species nomenclature, and nativity status follows Haines (2011). CT NDDDB polygons investigated on the pipeline corridor are identified on the attached set of site plans entitled "CT NDDDB Polygons and Confirmed Locations of Rare Species, dated July 2014" (Appendix E).

Species descriptions and habitat requirements for the state-listed rare plant species reported to occur within the project limits were reviewed in botanical manuals and technical references for the New England region. Botanical references and manuals consulted in the preparation of the species descriptions and habitat preferences summarized in the field worksheets include:

- *Flora Novae Angliae*: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England (Haines 2011)
- Manual of Vascular Plants of Northeastern United States and Adjacent Canada (Gleason and Cronquist 1993)
- Field Guide to Carex of New England (Standley 2011)

- Flora of North America. Volume 23 (Flora of North America Editorial Committee 2002).
- Gray's Manual of Botany (Fernald 1950)

Summaries of the Connecticut legal status, plant descriptions, habitat preferences, and flowering and fruiting periods for the state-listed rare plant species were prepared for review during the targeted rare plant surveys. The species profile descriptions consulted during the targeted field surveys are attached (Appendix F).

## 4.0 Results

AECOM botanists investigated six CT NDDB areas along the pipeline corridor in the Towns of Suffield and East Granby, Connecticut, where permanent and temporary construction activities associated with the Project will impact plant communities within the pipeline corridor or adjacent to the access roads. A plant list identifying which species were observed during the course of the surveys is included in Appendix G.

### 4.1 CT NDDB Feature ID: South of Hickory Street

The CT NDDB polygon is located approximately 900 feet south of Hickory Street in the Town of Suffield, Hartford County, Connecticut. Botanical surveys were performed on June 18, 2014 and July 8, 2014. The CT NDDB area south of Hickory Street contains an expansive area containing active agricultural fields, fallow agricultural fields, and open meadow habitats. Plantation conifer stands of white spruce (*Picea glauca*) and white pine (*Pinus strobus*) with several hardwood associates, including red maple (*Acer rubrum*), scarlet oak (*Quercus coccinea*), and eastern black cherry (*Prunus serotina*) are also present. The plantation forest borders the pipeline corridor in the area of MP 0.5 near the start of the CT NDDB polygon. The polygon ends near MP 0.75. Residential structures are present to the west of the pipeline corridor along North Street (Route 75).

Herbaceous plant species and clusters of low shrubs are present in the ROW. Control of the woody shrubs in the ROW under a vegetation management program was evident. Herbaceous species recorded in the ROW include reed canary-grass (*Phalaris arundinaceae*), Canada bluejoint (*Calamagrostis canadensis*), sallow sedge (*Carex lurida*), woolly-fruited sedge (*Carex lasiocarpa*), fringed sedge (*Carex crinita*), fox sedge (*Carex vulpinoidea*), awl-fruited sedge (*Carex stipata*), and jewelweed (*Impatiens capensis*). Other associate species include Canada lily (*Lilium canadense*), rice cut-grass (*Leeria oryzoides*), grass-leaved goldenrod (*Euthamia graminifolia*), rough goldenrod (*Solidago rugosa*), and purple loosestrife (*Lythrum salicaria*). Shrub and vine species include arrow-wood (*Viburnum dentatum*), meadowsweet (*Spiraea alba* var. *latifolia*), silky dogwood (*Swida amomum*), and fox grape (*Vitis labrusca*).

No state-listed rare plants were observed in the field surveys in this CT NDDB polygon.

### 4.2 CT NDDB Feature ID: South of Halladay Avenue West

This CT NDDB polygon is located approximately 1,000 feet south of Halladay Avenue West in the Town of Suffield, Hartford County, Connecticut. Botanical surveys were performed on June 18, 2014, July 8, 2014 and September 3, 2014. The CT NDDB area south of Halladay Avenue West encompasses agricultural fields, overgrown fields, dry upland meadows, and wet meadows. Areas of

upland and wetland forest habitat border the ROW. Adjacent parcels in the CT NDDB polygon support farmland and farm buildings, horse stables, and residential structures. The CT NDDB polygon extends from approximately MP 1.75 to MP 2.3.

Common to frequent herbaceous species observed in the open fields and meadows include reed canary-grass, Canada bluejoint, timothy (*Phleum pratense*), sweet vernal-grass (*Anthoxanthum odoratum*), fescue grass (*Festuca* sp.), rough goldenrod, fox sedge, awl-fruited sedge, sallow sedge, sensitive fern (*Onoclea sensibilis*), and soft rush (*Juncus effusus*). Shrub species include arrow-wood, silky dogwood, multiflora rose (*Rosa multiflora*), speckled alder (*Alnus incana* spp. *rugosa*), autumn olive (*Elaeagnus umbellata*), and eastern cottonwood (*Populus deltoides*).

Nine populations of squarrose sedge (*Carex squarrosa*) were recorded on or near the western edge of the ROW in the vicinity of MP 1.8-1.9. The populations and general habitat conditions were photo-documented and information was collected on the associated plant species and habitat to prepare a CT Rare Plant Survey Form. The sedge identification was confirmed on July 8, 2014 when mature perigynia and achenes were examined with a 10X hand lens. Nearby areas were surveyed for additional populations. General views of the old field/meadow habitat near the squarrose sedge populations are included in Appendix C with photographs of the young inflorescence. Confirmed populations were located by GPS and transferred to the site plans (Appendix E).

No other state-listed rare plants were observed in the survey area in the CT NDDB polygon.

#### **4.3 CT NDDB Feature ID: Muddy Brook North of Hill Street**

The CT NDDB polygon is located approximately 0.6 miles north of Hill Street in the Town of Suffield, Hartford County, Connecticut. Botanical surveys were performed on June 18, 2014 and July 8, 2014. The CT NDDB polygon encompasses the riparian community adjacent to Muddy Brook (approx MP 2.9 – MP 3.1).

Common to frequent herbaceous species recorded in the herbaceous community in the ROW include jewelweed, stinging nettle (*Urtica dioica*), rough goldenrod, skunk cabbage (*Symplocarpus foetidus*), fringed sedge, awl-fruited sedge, sensitive fern, cinnamon fern (*Osmundastrum cinnamomeum*), and field horsetail (*Equisetum arvense*). Canopy species in the forest habitat bordering Muddy Brook include red maple, white ash (*Fraxinus americana*), and elm (*Ulmus* sp.). Shrub associates include spicebush (*Lindera benzoin*), common winterberry (*Ilex verticillata*), and multiflora rose.

No state-listed rare plants were observed in the open riparian community bordering Muddy Brook at the ROW crossing or in the bottomland forest adjacent to the ROW. In addition, no rare plant species were observed along the margin of the cultivated agricultural fields in the vicinity of the ROW. The gravel access road to the ROW crosses agricultural fields where suitable rare plant habitat is absent.

#### **4.4 CT NDDB Feature ID: North of Taintor Street**

The CT NDDB polygon is located generally west of the ROW in the vicinity of MP 5.5 in the Town of Suffield, Hartford County, Connecticut. The botanical assessment was performed on June 17 and 18, 2014 from Taintor Street at Stony Brook. The CT NDDB area generally encompasses the wooded community and wetland communities associated with Stony Brook. Active agricultural fields are also encompassed by the CT NDDB area.

No state-listed rare plants were observed in the transitional areas bordering Stony Brook at the bridge crossing. The access road from Taintor Street to the ROW crosses agricultural fields in the buffer area to Stony Brook, but suitable rare plant habitat appears to be absent.

#### 4.5 CT NDDB Feature ID: North of Russell Road

The CT NDDB polygon areas are located in the Towns of Suffield and East Granby, Hartford County, Connecticut. Botanical surveys were performed on June 17, 2014 and July 8, 2014. The CT NDDB areas include an expansive area of forested uplands, forested wetlands, scrub-shrub wetlands, agricultural fields, overgrown and disturbed fields, and areas of commercial development. The survey areas along the ROW were accessed from Russell Road (MP 7.4) and walked to the north to approximately MP 6.5 to include the northern section of the CT NDDB area crossed by the ROW. The access road from Russell Road and sections of the proposed pipeyard area in proximity to the CT NDDB area in East Granby were also investigated.

Common to frequent herbaceous species recorded in the moist to wet herbaceous community in the ROW include fringed sedge, sallow sedge, fox sedge, tussock sedge (*Carex stricta*), bladder sedge (*Carex intumescens*), dark-green bulrush (*Scirpus atrovirens*), cinnamon fern, royal fern (*Osmunda regalis*), interrupted fern (*Osmunda claytonia*), New York fern (*Parathelypteris noveboracensis*), fox grape, and summer grape. Canopy species in the adjacent forest habitat include red oak (*Quercus rubra*), white oak (*Quercus alba*), American beech (*Fagus grandifolia*), black birch (*Betula lenta*), white ash, and tuliptree (*Liriodendron tulipifera*). White pine occurred as an infrequent associate. Shrub species include arrow-wood, witch-hazel (*Hamamelis virginiana*), and multiflora rose. Flat-branched tree-clubmoss (*Dendrolycopodium obscurum*) and Canada-mayflower (*Maianthemum canadense*) occurred in the ground layer.

No state-listed rare plants were observed in the field surveys in this CT NDDB polygon.

#### 4.6 CT NDDB Feature ID: Nicholson Road

The CT NDDB polygon is located generally south of Nicholson road in the Town of East Granby, Hartford County, Connecticut. Botanical surveys were performed on June 17, 2014 and July 8, 2014. The CT NDDB area in the vicinity of the ROW encompasses a highly developed area with commercial buildings and paved parking areas adjacent to the ROW. The transitional and wetland communities adjacent to DeGraves Brook were investigated along with the dry, open upland field habitat accessed from Kripes Road. Targeted surveys were performed along the road shoulder and in the open sandy areas within the CT NDDB area in the pipeline corridor for state-listed rare plants.

Common to frequent herbaceous species recorded in the scrub-shrub wetland thicket investigated include rough goldenrod, sensitive fern, jewelweed, sallow sedge, fringed sedge, fox sedge, and tussock sedge. Shrub species include arrow-wood, multiflora rose, and speckled alder. Herbaceous species observed in the dry, upland field habitat south of Nicholson Road include such species as yarrow (*Achillea millefolium*), rough cinquefoil (*Potentilla recta*), silvery cinquefoil (*Potentilla argentea*), old field cinquefoil (*Potentilla simplex*), four-flowered yellow-loosestrife (*Lysimachia quadrifolia*), Deptford pink (*Dianthus armeria*), bedstraw (*Galium* sp.), round-headed bush-clover (*Lespedeza capitata*), and birds-foot trefoil (*Lotus corniculatus*). Vines of poison ivy (*Toxicodendron radicans*), blackberry (*Rubus* sp.), and Asian bittersweet (*Celastrus orbiculatus*) were also common.

No state-listed rare plants were observed in the survey area in the CT NDDB polygon.

## 5.0 References

- Angelo, R., and D. E. Boufford. 2007. Atlas of the Flora of New England: Cyperaceae. *Rhodora* 109: 237-360.
- CT DEEP. 2014. Connecticut Department of Energy and Environmental Protection – Endangered, Threatened & Special Concern Plants. (Accessed May 16, 2014).
- Fernald, M. L. 1950. Gray's Manual of Botany. 8<sup>th</sup> Edition. American Book Company, NY.
- Flora of North America Editorial Committee. 2002. Flora of North America. Volume 23: *Magnoliophyta: Commelinidae (in part): Cyperaceae*. Oxford University Press, New York. Available URL: <http://www.efloras.org>.
- Gleason, Henry A., and A. Cronquist. 1993. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2<sup>nd</sup> Edition. The New York Botanical Garden, Bronx, NY.
- Haines, Arthur. 2011. *Flora Novae Angliae: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England*. Yale University Press, New Haven, CT.
- Holmgren, Noel. 1998. The Illustrated Companion to Gleason and Cronquist's Manual. Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden, Bronx, NY.
- MA NHESP. 2009. Fact Sheet for Bush's Sedge, *Carex bushii*. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife, West Boylston, MA.
- McKay, D. 2013. Correspondence dated November 23, 2013, from Dawn M. McKay, CT NDDB to Julia Stearns, AECOM Environment, regarding NDDB Determination No. 201304121.
- New York Natural Heritage program. 2013. NYNHP Plant Conservation Guide – Early Frostweed (*Crocianthemum propinquum*). New York Natural Heritage Program, Albany, NY. Available URL: <http://www.acris.nynhp.org>.
- Standley, Lisa A. 2011. Field Guide to *Carex* of New England. Special Publication of the New England Botanical Club, Harvard University Herbaria, Cambridge, MA.

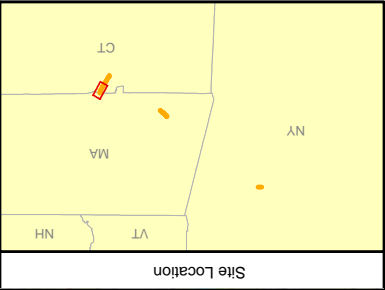
### Web Sources:

Kansas Wildflowers & Grasses – Bush's Sedge (*Carex bushii*)  
[http://www.kswildflower.org/sedge\\_details.php?sedgeID=43](http://www.kswildflower.org/sedge_details.php?sedgeID=43)

## **Appendix A**

### **USGS Site Locus**





- Legend**
- Mileposts
  - Proposed Project Centerline
  - Town Boundary
  - County Boundary
  - Access Roads
  - MLV Locations
  - Piperyards



0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

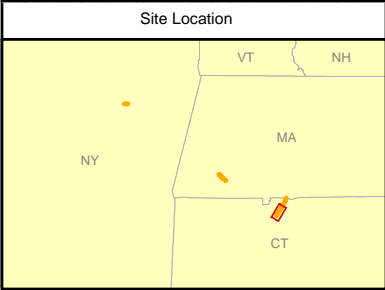
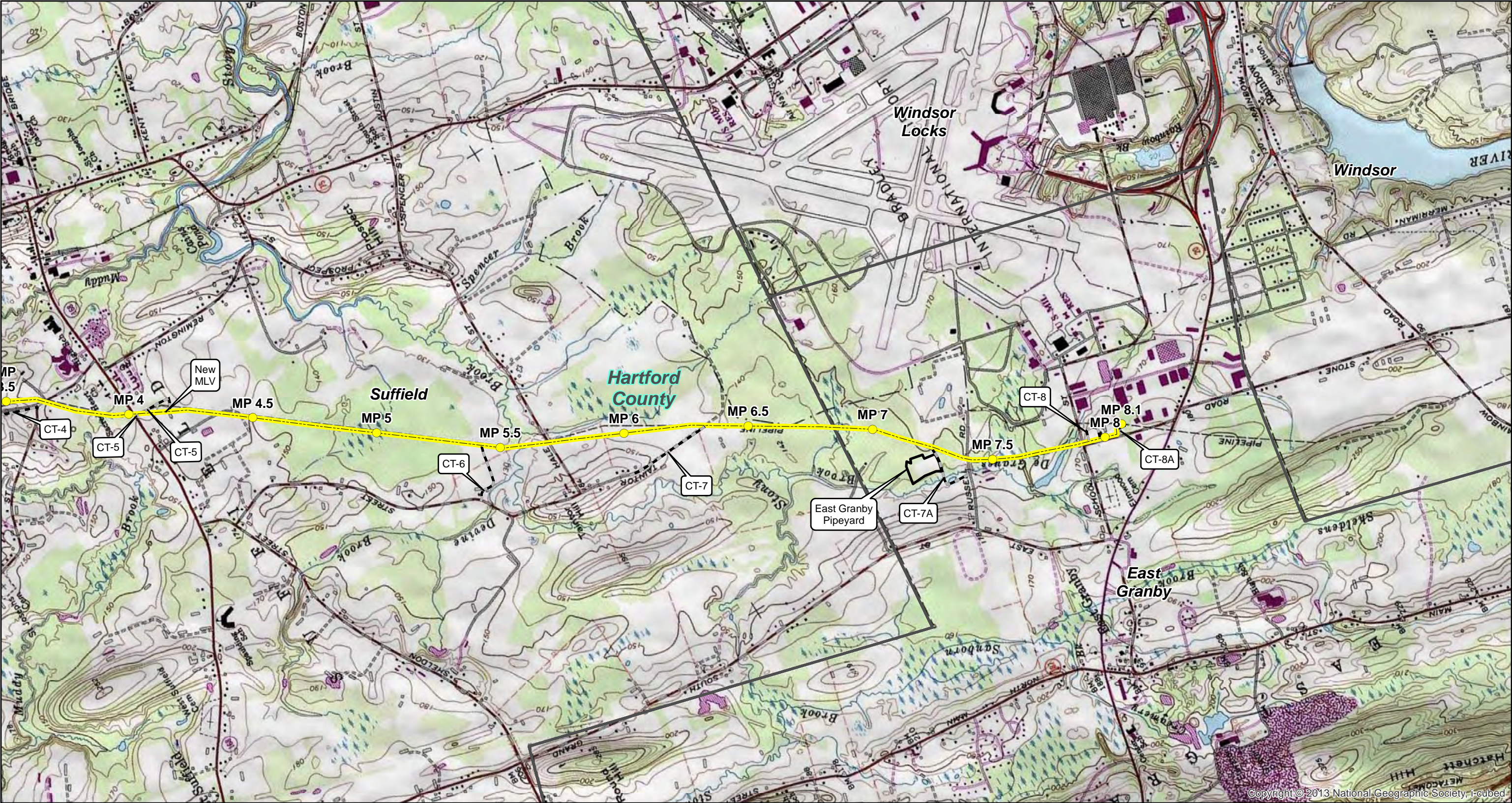
Tennessee Gas Pipeline Company, L.L.C.  
Connecticut Expansion Project  
Connecticut Loop

Tennessee Gas Pipeline  
Company, L.L.C.  
a Kinder Morgan company

Figure 1

August 2014

Page 1 of 2



**Legend**

- Mileposts
- Proposed Project Centerline
- Access Roads
- MLV Locations
- Pipeyards
- Town Boundary
- County Boundary

Tennessee Gas Pipeline Company, L.L.C.

Connecticut Expansion Project

Connecticut Loop

0

1,000

2,000

4,000

Feet

1 inch = 2,000 feet

Tennessee Gas Pipeline Company, L.L.C.  
a Kinder Morgan company

Figure 1

August 2014

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## **Appendix B**

### **CT NDDB Consultation Letter**





Connecticut Department of

**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

November 23, 2013

Ms. Julia Stearns  
AECOM Environment  
10 Orms Street, Suite 405  
Providence, RI 02901

Project: Preliminary Assessment of Tennessee Gas Pipeline Company Connecticut Expansion Project, Suffield to East Granby, Connecticut  
NDDB Determination No.: 201304121

Dear Ms. Stearns,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map provided for the Preliminary Assessment of Tennessee Gas Pipeline Company Connecticut Expansion Project, Suffield to East Granby, Connecticut. I have attached a list of Federal and State Listed species that are known to occur within your project boundaries. Please be advised that this is a preliminary review and not a final determination. A more detailed review will be necessary to move forward with any subsequent environmental permit applications submitted to DEEP for the proposed project. This determination is good for one year.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey 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 substitutes 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. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits.

Please contact me if you have further questions at (860) 424-3592, or [dawn.mckay@ct.gov](mailto:dawn.mckay@ct.gov) . Thank you for consulting the Natural Diversity Data Base.

Sincerely,

A handwritten signature in cursive script that reads "Dawn M. McKay".

Dawn M. McKay  
Environmental Analyst 3

# Species List for Request Number

R201304121

11/23/2013

<u>Scientific Name</u>	<u>Common Name</u>	<u>State Protection Status</u>
<b>Animals</b>		
<i>Alasmodonta heterodon</i>	Dwarf wedge mussel	E
<i>Alasmodonta varicosa</i>	Brook floater	E
<i>Ammodramus savannarum</i>	Grasshopper sparrow	E
<i>Apamea burgessi</i>	Apamea moth	SC
<i>Bartramia longicauda</i>	Upland sandpiper	E
<i>Brachinus cyanipennis</i>	Bombardier beetle	SC
<i>Cicindela formosa generosa</i>	Pine barrens tiger beetle	SC
<i>Circus cyaneus</i>	Northern harrier	E
<i>Dolichonyx oryzivorus</i>	Bobolink	SC
<i>Eremophila alpestris</i>	Horned lark	E
<i>Euchlaena madusaria</i>	Scrub euchlaena	SC
<i>Eumacaria latiferrugata</i>	Brown-bordered geometer	SC
<i>Euxoa violaris</i>	Violet dart moth	T
<i>Falco sparverius</i>	American kestrel	T
<i>Glyptemys insculpta</i>	Wood turtle	SC
<i>Grammia phyllira</i>	Phyllira tiger moth	E
<i>Harpalus eraticus</i>	Ground beetle	SC
<i>Heterodon platirhinos</i>	Eastern hognose snake	SC
<i>Passerculus sandwichensis</i>	Savannah sparrow	SC
<i>Poocetes gramineus</i>	Vesper sparrow	E
<i>Schinia spinosae</i>	Noctuid moth	SC
<i>Sturnella magna</i>	Eastern meadowlark	SC
<i>Terrapene carolina carolina</i>	Eastern box turtle	SC
<i>Tetragonoderus fasciatus</i>	Ground beetle	SC
<i>Toxostoma rufum</i>	Brown thrasher	SC
<b>Natural Communities</b>		
<i>Sand barren</i>		
<b>Plants</b>		
<i>Carex bushii</i>	Sedge	SC
<i>Carex squarrosa</i>	Sedge	SC
<i>Helianthemum propinquum</i>	Low frostweed	T
<i>Vitis x novae-angliae</i>	New England grape	SC

## **Appendix C**

### **Photographs of Site Conditions in CT NDDB Polygons with Confirmed State-listed Species**



# APPENDIX C

## PHOTOGRAPHIC LOG

<b>Client:</b> Tennessee Gas Pipeline Co., LLC		<b>Site Location:</b> Suffield, CT	<b>Project No.</b> 60306709
<b>Photo No.</b> 1	<b>Date:</b> 06-18-14		
<b>Direction Photo Taken:</b>  View to the South			
<b>Description:</b>  View of the open field habitat in the pipeline ROW in the CT NDDDB area identified south of Halladay Avenue West, Suffield, CT.  Approximate MP 1.9. Several populations of squarrose sedge were recorded at the edge of the field near the tree line.			

<b>Photo No.</b> <b>2</b>	<b>Date:</b> 06-18-14	
<b>Direction Photo Taken:</b>  NA		
<b>Description:</b>  Squarrose sedge inflorescence found at the western edge of the pipeline ROW near the tree line. Species was confirmed based on the mature perigynia and achenes.  Clusters are threatened by invasive species, e.g., autumn- olive and agricultural grasses.		

# APPENDIX C

## PHOTOGRAPHIC LOG

<b>Client:</b> Tennessee Gas Pipeline Co., LLC		<b>Site Location:</b> Suffield, CT	<b>Project No.</b> 60306709
<b>Photo No.</b> 3	<b>Date:</b> 07-08-14		
<b>Direction Photo Taken:</b>  NA			
<b>Description:</b>  Cluster of squarrose sedge inflorescences in the field habitat at the western edge of the work area near the tree line.  Herbaceous associates recorded include reed canary grass and soft rush.			

<b>Photo No.</b> 4	<b>Date:</b> 07-08-14	
<b>Direction Photo Taken:</b>  View to the Southwest		
<b>Description:</b>  View of the open field habitat near the tree line where clusters of squarrose sedge were found hidden in the tall grasses.  Note squarrose sedge inflorescences in the dense vegetative cover in the foreground.		

## **Appendix D**

### **CT Rare Plant Survey Form**



OFFICE USE ONLY		EO#:
SNAME:	SITE:	SURVEY DATE:
	TOWN:	ENTERED BY:

- ☒ New record  
☐ Update

## RARE PLANT SURVEY FORM

Natural Diversity Data Base  
 Connecticut Department of Environmental Protection  
 79 Elm Street, 6<sup>th</sup> Floor  
 Hartford, CT 06106-5127

*Please complete this form to the best of your ability.  
 Submit survey forms, maps, and all supporting documents to the address above.*

*SPECIES SCIENTIFIC NAME: <i>Carex squarrosa</i>	Element Occurrence (EO) # (if known):
--	---------------------------------------

REPORTER INFORMATION	
Name(s): <i>Donald Schall</i>	
Address: <i>AECOM, 9 Jonathan Bourne Drive</i>	Telephone No: <i>508-274-8834 cell</i>
<i>Pocasset, MA 02559</i>	E-mail address: <i>donald.schall@aecom.com</i>

SURVEY/SITE INFORMATION	
Site Name: <i>Tennessee Gas Pipeline ROW, So. of Halladay Avenue West</i>	Survey Date(s): <i>June 18, 2014, July 8, 2014, September 3, 2014</i>
Town(s): <i>Town of Suffield</i>	County: <i>Hartford County</i>

**Directions** to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found).  
*CT NDDDB Area is located approximately 1,000 feet south of Halladay Avenue West in the Town of Suffield, CT. Site is accessed from Halladay Avenue West at the pipeline crossing. Parking is at the service road entrance into the ROW. Refer to attached map set.*

GPS Coordinates	Method Used to Determine Coordinates:
Latitude <i>42 00' 32.6" N</i> N	<input checked="" type="checkbox"/> GPS Unit GPS Make/Model: <i>HiPer II, Tesla</i>
Longitude: <i>72 38' 51.5" W</i> W	<input type="checkbox"/> Mapping Software Software:
Coordinate system (NAD83 preferred): <i>NAD83</i>	<input type="checkbox"/> Online Maps Online site:

### POPULATION DATA

Population Size	
Actual No. Observed	<i>9 colonies</i>
Estimated No./Range	

What was counted?
(e.g. stems, clumps, floating masses, etc.) <i>Clusters of stems in discrete populations</i>

Population Area	
Length (units)	
Width (units)	
Area (units)	<i>0.5-1.0 m</i>

Evidence of disease, predation or injury? ☐ Yes ☒ No Explain:

Phenology			
<i>5</i>	% In leaf	<i>5</i>	% Mature fruit
	% In flower bud		% Seed dispersing
	% In flower		% Dormant
<i>90</i>	% Immature fruit		% Senescent

Age Structure	
	% Seedlings
	% Immature
<i>95</i>	% Mature (established)
	% Senescent
<input type="checkbox"/>	Age structure unknown

Vigor
<input type="checkbox"/> Very feeble
<input type="checkbox"/> Feeble
<input checked="" type="checkbox"/> Normal
<input type="checkbox"/> Vigorous
<input type="checkbox"/> Exceptionally vigorous

Comments on above: *Populations were recorded in the open grassy field/meadow habitat along the western edge of the ROW at or near the tree line. Populations occur in dense herbaceous vegetation.*

## HABITAT

Aspect		Slope	Light	Topographic Position	Moisture
<input type="checkbox"/> N	<input type="checkbox"/> NE	<input checked="" type="checkbox"/> 0-3%	<input checked="" type="checkbox"/> Open	<input type="checkbox"/> Crest	<input type="checkbox"/> Permanently Inundated
<input type="checkbox"/> E	<input type="checkbox"/> NW	<input type="checkbox"/> 3-8%	<input type="checkbox"/> Partial	<input type="checkbox"/> Upper Slope	<input type="checkbox"/> Seasonally Inundated/Exposed
<input type="checkbox"/> S	<input type="checkbox"/> SE	<input type="checkbox"/> 8-15%	<input type="checkbox"/> Filtered	<input type="checkbox"/> Mid-Slope	<input type="checkbox"/> Tidally Inundated/Exposed
<input type="checkbox"/> W	<input type="checkbox"/> SW	<input type="checkbox"/> 15-35%	<input type="checkbox"/> Shade	<input type="checkbox"/> Lower-Slope	<input checked="" type="checkbox"/> Saturated (Hydric)
<input type="checkbox"/> Flat		<input type="checkbox"/> 35% - vertical		<input type="checkbox"/> Bottom	<input checked="" type="checkbox"/> Moist (Mesic)
	° re true N	Measured (° or %): %		Other: <i>Level topography</i>	<input type="checkbox"/> Dry-Mesic
X	° re mag N	Horizontal shape (as for next item):			<input type="checkbox"/> Dry-Xeric
		Vertical shape (ie. Convex, concave, straight, variable):			Other:

Elevation: 140 to 150 ☒ feet ☐ meters

Soil/substrate name/description(give source): *Scitico, Shaker, and Maybid Silt Loam Soils, 0 to 3 percent slopes and Brancroft Silt Loam Soil, 3 to 8 percent slopes. Source: USDA, Natural Resources Conservation Service - Web Soil Survey, Accessed 8-28-2014.,*  
Estimated # of acres of potential habitat in the immediate area: Unknown

Evidence of disturbance: ☐ fire ☐ logging ☐ disease ☐ insect damage ☐ windthrow ☒ invasives

Comments: *Colonies near or at the tree line are potentially threatened by autumn olive (Elaeagnus umbellata) shrubs and Asian bittersweet (Celastrus orbiculatus) vines. Dense herbaceous growth is present around the colonies, but does not appear to be inhibiting the growth of the sedges.*

Associated natural/plant communities: *Plant community is open, grassy field/meadow habitat in the maintained ROW. Adjacent communities include forested uplands and forested wetlands.*

Associated plant species (separated strata, e.g. tree, shrub, herb layers): *Associate herbaceous species in the ROW include reed canary-grass (Phalaris arundinaceae), soft rush (Juncus effusus), fox sedge (Carex vulpinoidea), awl-fruited sedge (Carex stipata), dark green bulmsedge (Scirpus atrovirens), sensitive fern (Onoclea sensibilis), and agricultural grasses. Shrubs recorded at the tree line include speckled alder (Alnus incana spp. rugosa), arrow-wood (Viburnum dentatum), and silky dogwood (Swida amomum = Cornus amomum) Tree species include red maple (Acer rubrum) and ash (Fraxinus sp.) in the adjacent woodland habitat.*

## IDENTIFICATION

Photograph taken?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Photo ID:
Specimen taken*	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	If yes, provide: Collector: Repository: Collection #:
Identification problems?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Explain: <i>Mature perigynia and achenes were examined to confirm the identification.</i>

\*DEP Scientific Collection Permit is needed to collect specimens

## CONSERVATION

Owner info:

Owner aware of EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown		Owner protecting EO? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown	
Threats to EO:	<i>Potential threat due to invasive species.</i>		
Conservation/ management needs:			
Research needs:			

<b>SUPPORTING DOCUMENTS</b> (please attach)
---

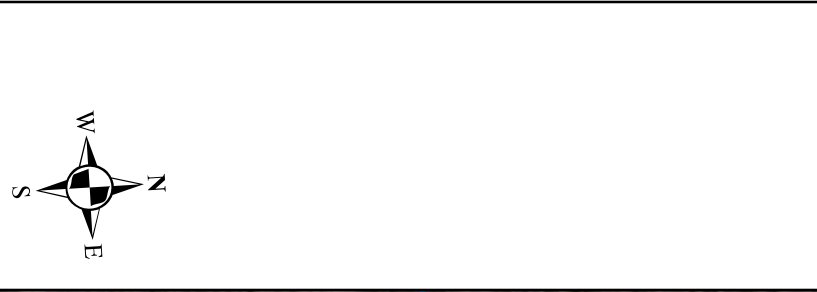
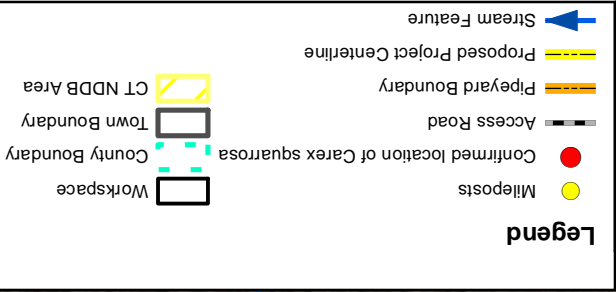
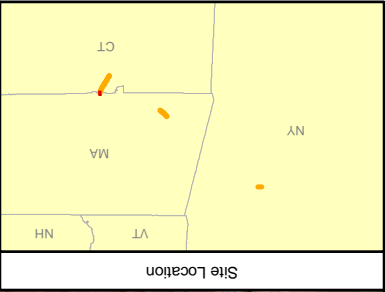
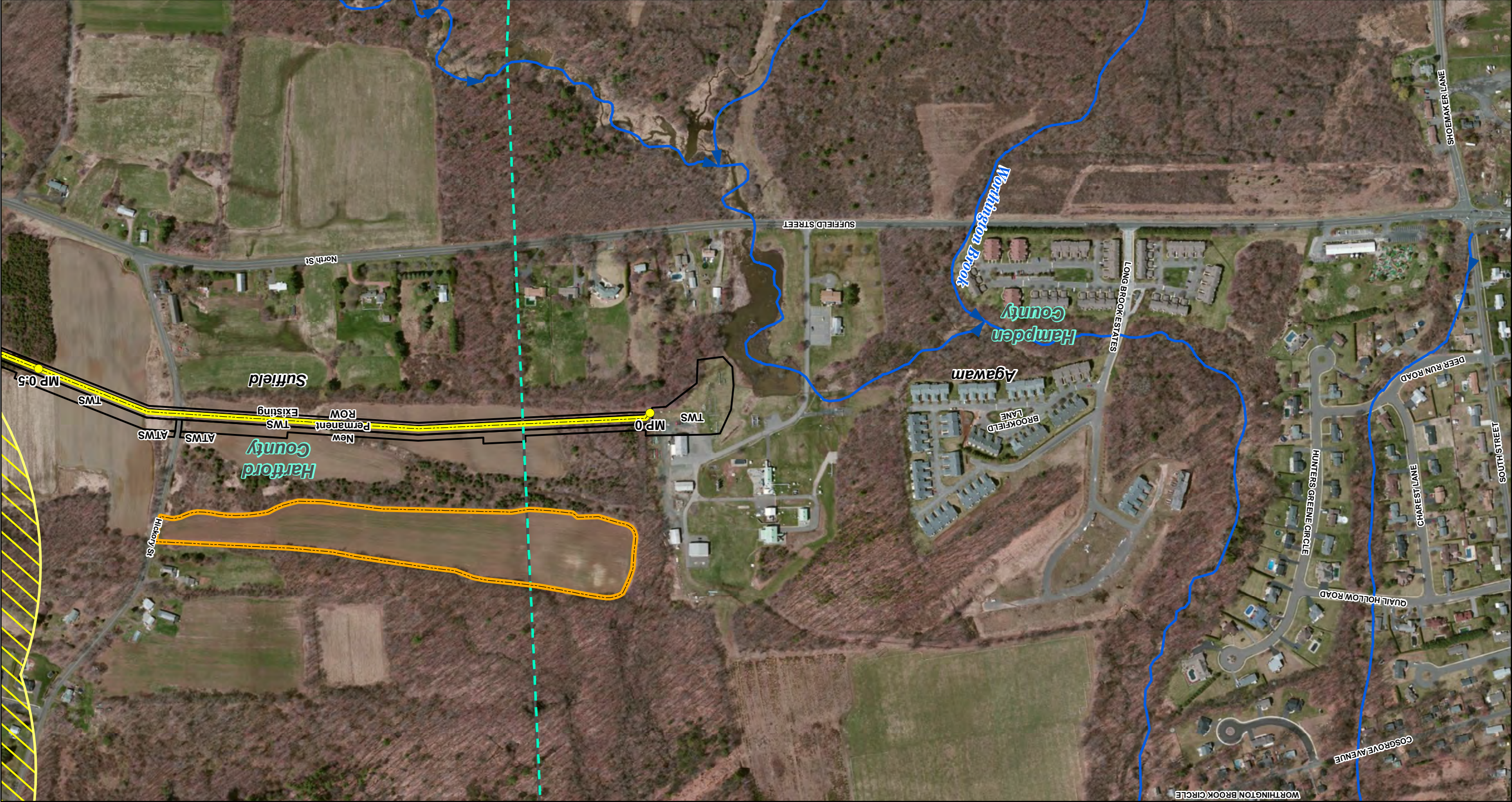
- ☐ Sketch map (showing finer detail than topo or aerial photo)  
☒ Aerial photo map  
☐ Topographic map (available at <http://www.econmap.com/magic/> OR <http://ctecoapp1.uconn.edu/advancedviewer/> )  
☐ Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)  
☒ Photos    ☐ Slides    ☐ Field notes    ☒ Route of survey map

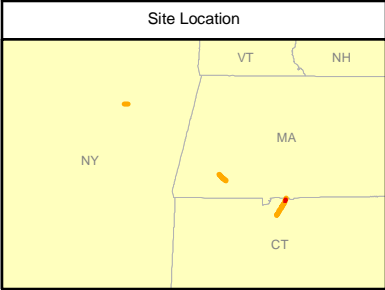


## **Appendix E**

### **CT Loop NDDB Polygon Mapping with Locations of State-listed Plant Species**

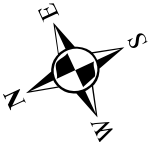






**Legend**

- Mileposts
- Confirmed location of *Carex squarrosa*
- Access Road
- Pipeyard Boundary
- Proposed Project Centerline
- ➔ Stream Feature
- Workspace
- County Boundary
- Town Boundary
- CT NDDB Area



Tennessee Gas Pipeline Company

CT Expansion Project

Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species

Connecticut

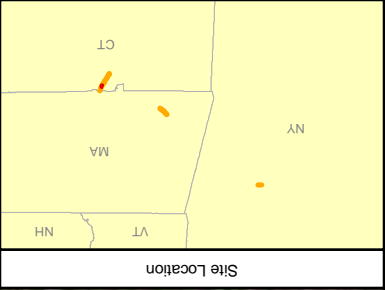
0 200 400 800 Feet

1 inch = 400 feet



September 5, 2014

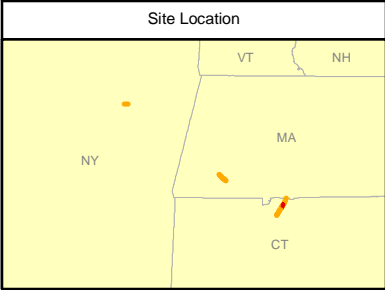
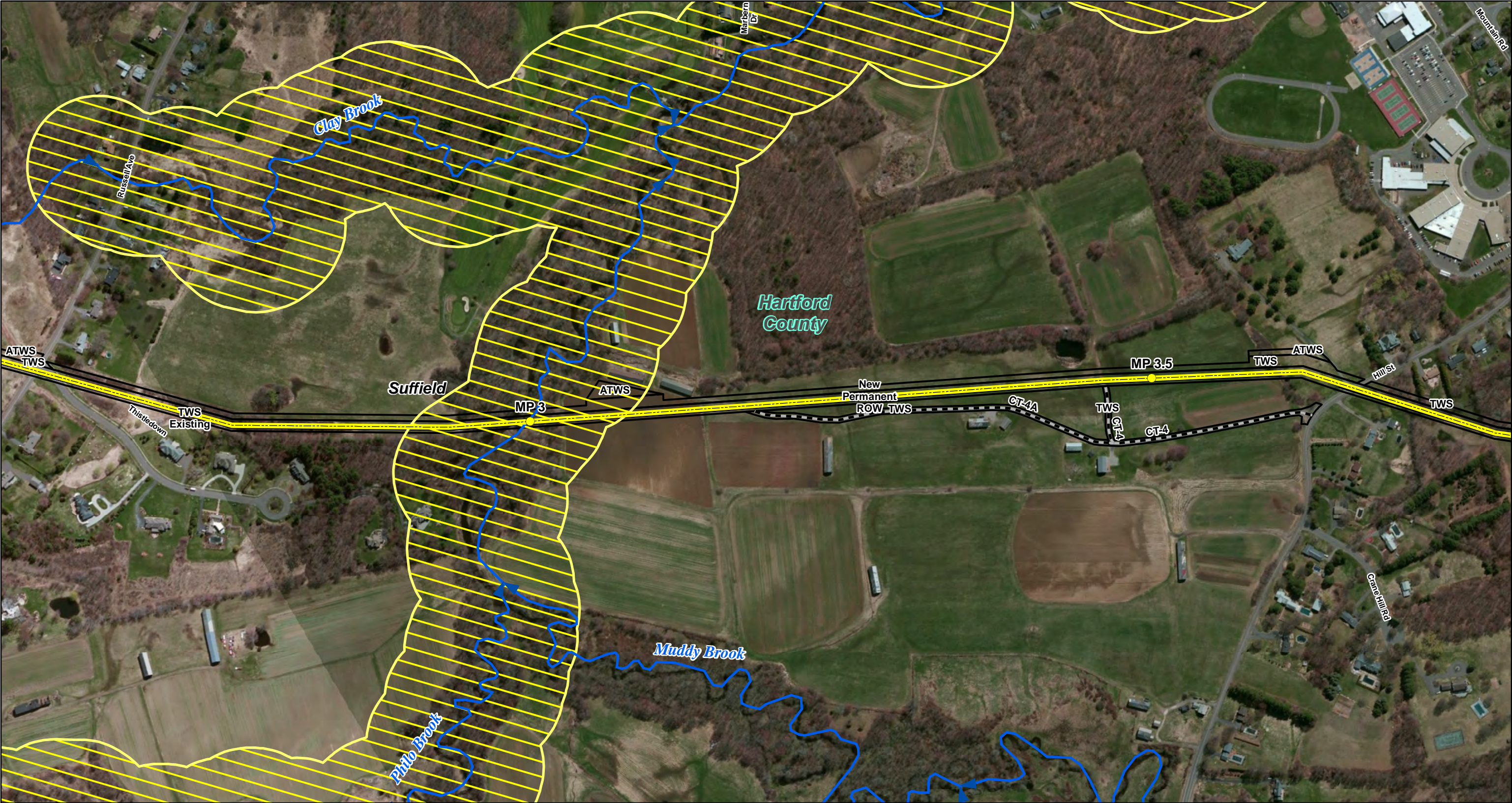
Page 2 of 8



- Legend**
- Mileposts
  - Confirmed location of *Carex squarrosa*
  - Access Road
  - Pipeyard Boundary
  - Proposed Project Centerline
  - Stream Feature
  - Workspace
  - County Boundary
  - Town Boundary
  - CT NDDB Area



Tennessee Gas Pipeline Company  
CT Expansion Project  
Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species  
Connecticut  
1 inch = 400 feet  
0 200 400 800 Feet



**Legend**

- Mileposts
- Confirmed location of *Carex squarrosa*
- Access Road
- Pipeyard Boundary
- Proposed Project Centerline
- ➔ Stream Feature
- Workspace
- County Boundary
- Town Boundary
- CT NDDB Area

North Arrow

Tennessee Gas Pipeline Company


CT Expansion Project

Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species

Connecticut

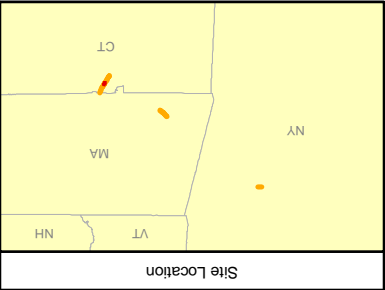
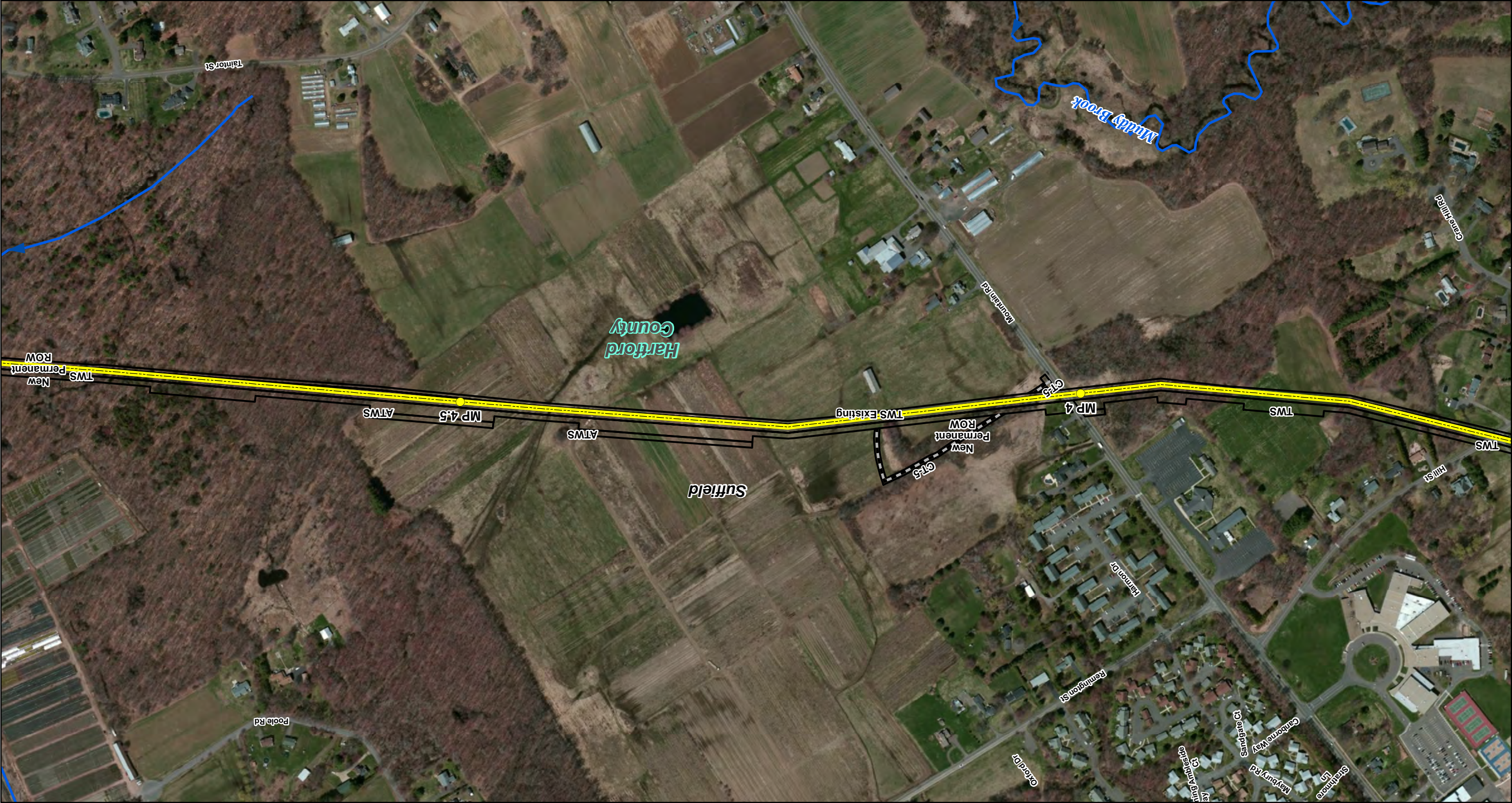
0 200 400 800 Feet

1 inch = 400 feet

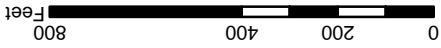
 Tennessee Gas Pipeline Company, L.L.C.  
a Kinder Morgan company

September 5, 2014

Page 4 of 8



- Legend**
- Mileposts
  - Confirmed location of *Carex squarrosa*
  - Access Road
  - Pipeline Boundary
  - Proposed Project Centerline
  - Stream Feature
  - Workspace
  - County Boundary
  - Town Boundary
  - CT NDDB Area

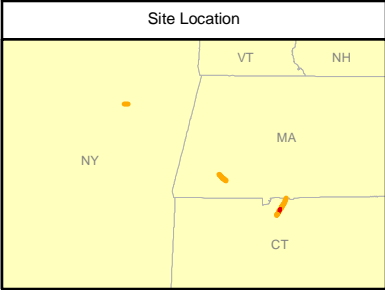


1 inch = 400 feet

Tennessee Gas Pipeline Company  
CT Expansion Project  
Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species  
Connecticut



Tennessee Gas Pipeline  
Company, L.L.C.  
a Kinder Morgan company



**Legend**

- Mileposts
- Confirmed location of *Carex squarrosa*
- Access Road
- Pipecard Boundary
- Proposed Project Centerline
- Stream Feature

- Workspace
- County Boundary
- Town Boundary
- CT NDDB Area

Tennessee Gas Pipeline Company

CT Expansion Project

Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species

Connecticut

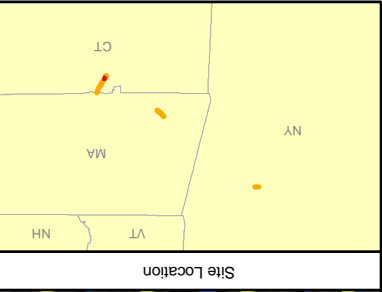
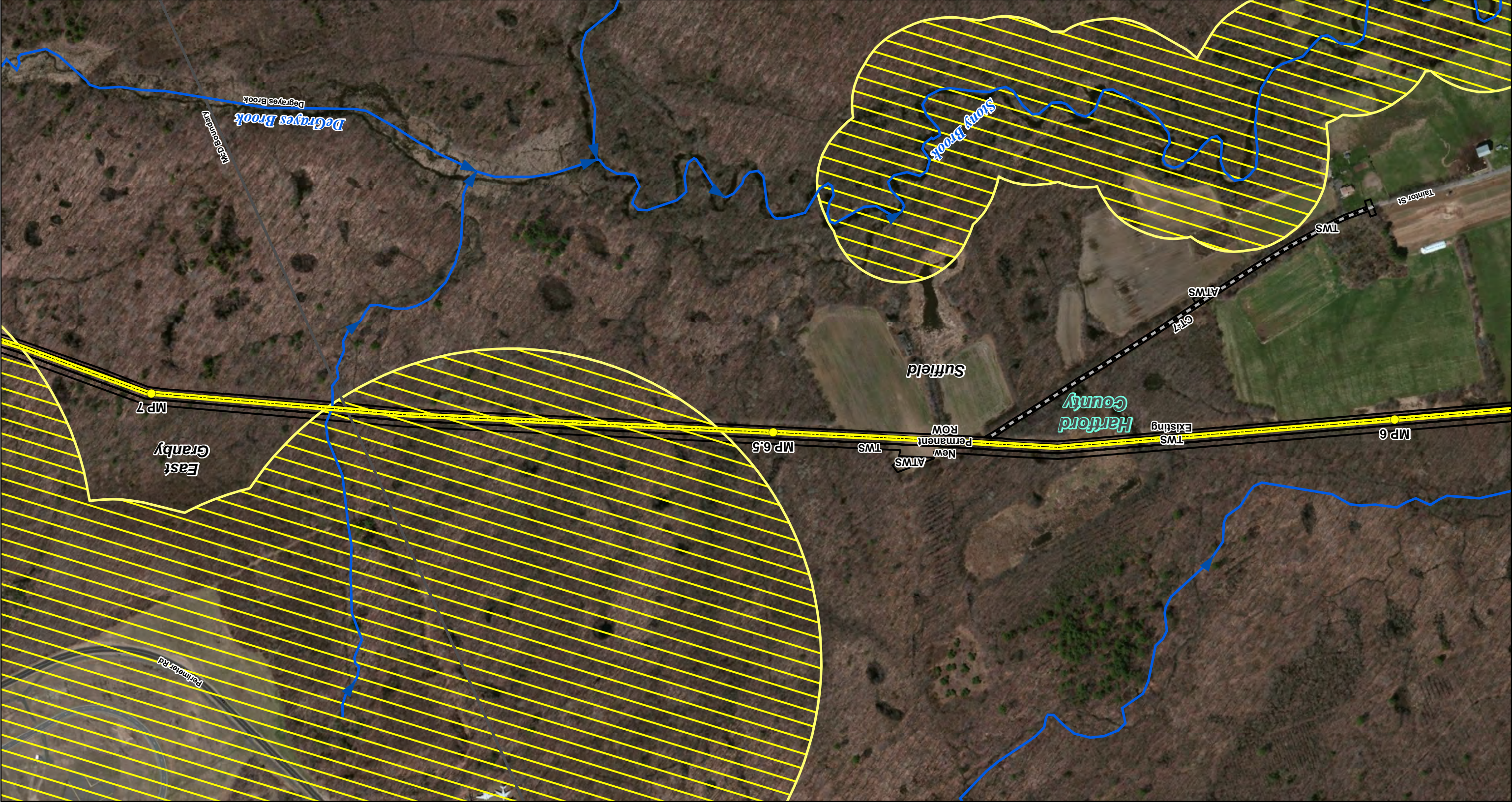
0 200 400 800 Feet

1 inch = 400 feet

Tennessee Gas Pipeline Company, L.L.C.  
a Kinder Morgan company

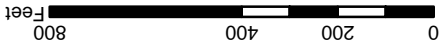
September 5, 2014

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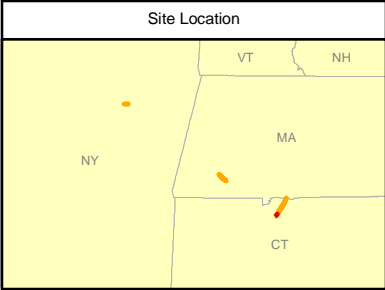
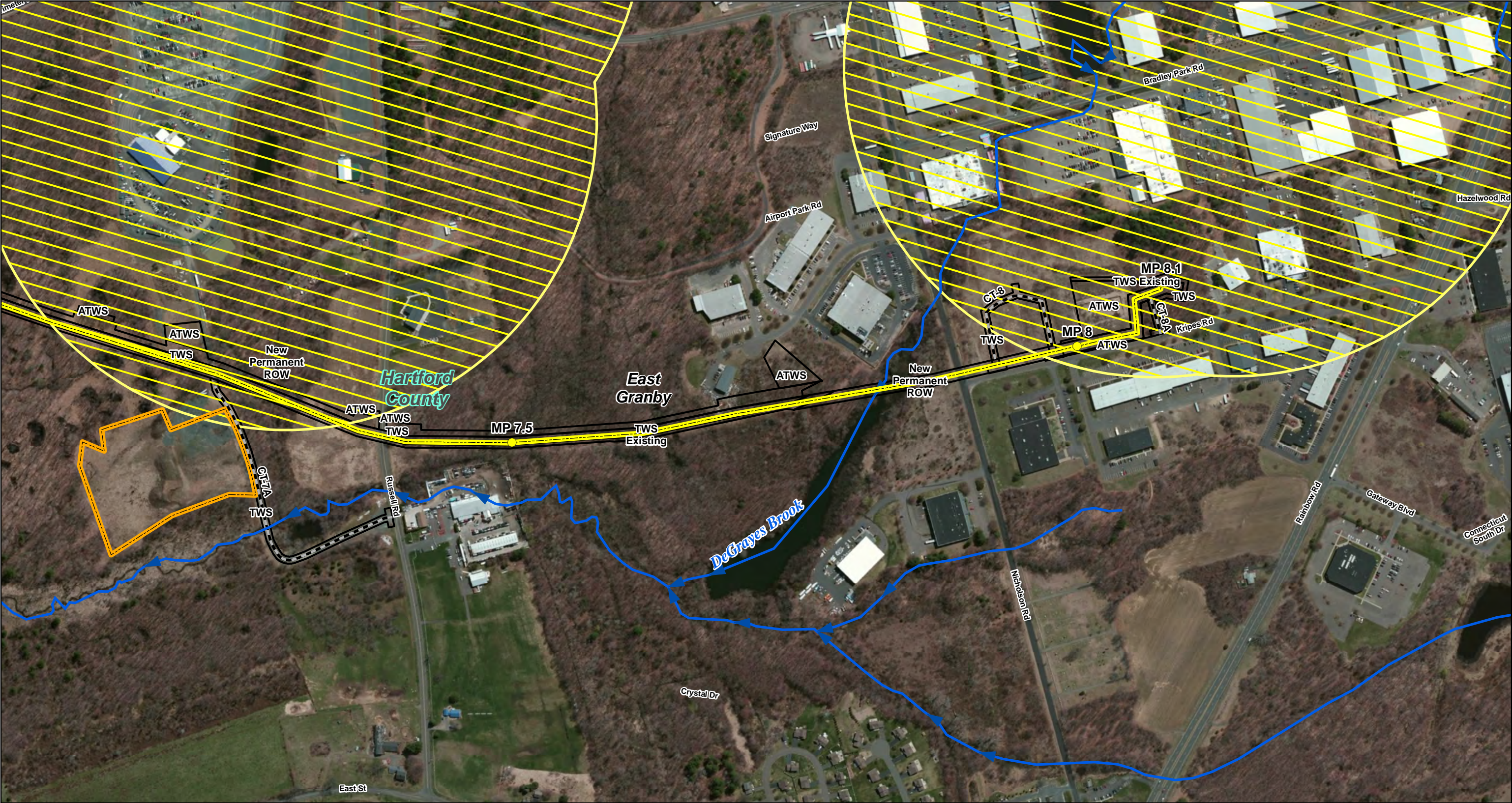
**Legend**

- Mileposts (Yellow circle)
- Confirmed location of *Carex squarrosa* (Red dot)
- Access Road (Black dashed line)
- Pipeyard Boundary (Orange dashed line)
- Proposed Project Centerline (Yellow line with black dashed lines)
- Stream Feature (Blue line with arrow)
- Workspace (Black rectangle)
- County Boundary (Green dashed line)
- Town Boundary (Black rectangle)
- CT NDDB Area (Yellow hatched area)



1 inch = 400 feet

Tennessee Gas Pipeline Company  
CT Expansion Project  
Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species  
Connecticut



**Legend**

- Mileposts
- Confirmed location of *Carex squarrosa*
- Access Road
- Pipeyard Boundary
- Proposed Project Centerline
- Stream Feature
- Workspace
- County Boundary
- Town Boundary
- CT NDDB Area

Tennessee Gas Pipeline Company

CT Expansion Project

Connecticut Natural Diversity Database Polygons  
and Confirmed Locations of State-listed Plant Species

Connecticut

0 200 400 800 Feet

1 inch = 400 feet

Tennessee Gas Pipeline Company, L.L.C.  
a Kinder Morgan company

September 5, 2014

Page 8 of 8

## **Appendix F**

### **Field Worksheets for State- Listed Plants**



**Tennessee Gas Pipeline Company Connecticut Expansion Project  
Threatened and Endangered Species Surveys  
Suffield to East Granby, Connecticut**

**Common Name:** New England Grape

**Scientific Name:** *Vitis x novae-angliae*

**Family:** Vitaceae (Grape Family)

**Connecticut Status:** Special Concern

**Federal Status:** Not Listed Federally

**Description:**

New England Grape is a perennial vine with tendrils or panicles (inflorescences) produced from 3-5 successive nodes. Young stems and leaves are tomentose. Leaf blades are abaxially tomentose when young, but become nearly glabrous later in the season. Patches of tomentum may remain on the undersurface. Teeth are short and wide on margin of round-ovate blades. Fruit is black and glaucous, 12-17 mm wide.

**Habitat:**

New England Grape occurs in rich, often alluvial woods and shaded forest edges. Species may also be present in clearings, roadside thickets, and along river banks.

**Flowering Period:**

Flowers present from late June to late July. Fruits are present in the summer into September.

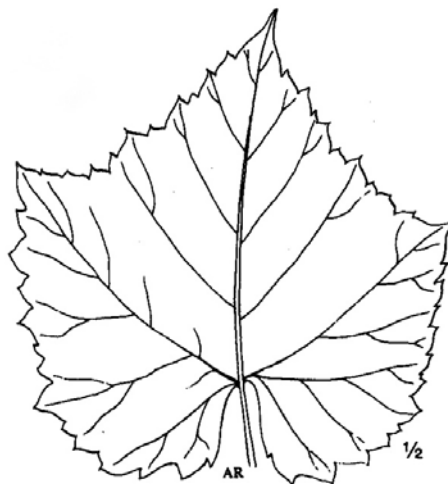
**Comments:**

New England Grape is an uncommon grape hybrid in New England states with a Facultative (FAC) wetland ranking.

**References:**

Refer to Haines (2011, pg. 889) and Gleason and Cronquist (1993, pg. 344) for additional identification details. Illustration is from Holmgren, et al. (1998, pg. 325).

June 24, 2014



3. *Vitis novae-angliae*

**Common Name:** Bush's Sedge

**Scientific Name:** *Carex bushii*

**Family:** Cyperaceae (Sedge Family)

**Connecticut Status:** Special Concern

**Federal Status:** Not Listed Federally

**Description:**

Bush's Sedge is a medium-sized, perennial species growing in loose tufts of slender, sharply angled stems. Culms (stems) are erect, 30-90 cm tall, sparsely pilose, with reddish-purple bases. Leaf sheaths are soft-hairy (pilose), red-brown dotted. Leaves 2.5-6 mm wide, pilose. Spikes are short, cylindric, stiff and erect, 2-3. Involucral bracts greatly exceed the inflorescence. Pistillate scales are lanceolate, 2.5-3.5 x 1.1-1.5 mm, reddish-brown with green midrib, exceeding perigynia, long-acuminate to awned (0.5-2 mm). Perigynia is sparsely pubescent, papillose (minuscule bumps), round in cross-section, several (9-13) nerved, 2.5-3.5 x 1.5-2.0 mm. Beak is absent. Achenes are triangular, 2-2.6 x 1.4-1.7 mm.

Species is similar to Hirsute Sedge (*Carex hirsutella*), which has flattened and more strongly ascending perigynia; and the awns on pistillate scales are shorter.

**Habitat:**

Species occurs in dry to mesic grasslands, sandy open meadows and woods, disturbed open ground, generally on calcareous soil.

**Flowering Period:**

Fruiting period is late spring to early summer (June-August).

**Comments:**

Bush's Sedge has a Facultative (FAC) wetland ranking.

**References:**

Angelo, R. and D.E. Boufford. 2007. Atlas of the Flora of New England: Cyperaceae. *Rhodora* 109: 237-360.

Flora of North America Editorial Committee. 2002. Flora of North America. Volume 23: *Magnoliophyta: Commelinidae (in part): Cyperaceae*. Oxford University Press, New York. (pg. 484)

Gleason, Henry A. and Arthur Cronquist. 1993. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2<sup>nd</sup> Edition. The New York Botanical Garden, Bronx, NY. (pg. 728)

Haines, Arthur. 2011. *Flora Novae Angliae*. Yale University Press, New Haven, CT. (pg.144)

Holmgren, Noel H., et al. 1998. The Illustrated Companion to Gleason and Cronquist's Manual – Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden, Bronx, NY. (pg. 681)

NHESP. 2009. Fact Sheet for Bush's Sedge, *Carex bushii*. Natural Heritage & Endangered Species Program, MA Division of Fisheries & Wildlife.

Standley, Lisa A. 2011. Field Guide to the Carex of New England. A Special Publication of the New England Botanical Club, Harvard University Herbaria, Cambridge, MA.

**Web Sources:**

Kansas Wildflowers & Grasses – Bush's Sedge (*Carex bushii*).  
[http://www.kswildflower.org/sedge\\_details.php?sedgeID=43](http://www.kswildflower.org/sedge_details.php?sedgeID=43).

USDA Natural Resources Conservation Services – PLANTS Profile for Bush's Sedge (*Carex bushii*).  
<http://www.plants.usda.gov>.

June 24, 2014

**Common Name:** Squarrose Sedge

**Scientific Name:** *Carex squarrosa*

**Family:** Cyperaceae (Sedge Family)

**Connecticut Status:** Special Concern

**Federal Status:** Not Listed Federally

**Description:**

Squarrose Sedge is a medium-sized, perennial species of wet habitats growing in dense tufts with short rhizomes. Stems (or culms) are 30-90 cm tall with smooth, glabrous, leaves, 3-6 mm wide. Ligule is much longer than wide. Lower sheaths brown, upper sheath tawny and brown-spotted, apex deeply concave. Spikes are erect, 1-2(-3) with an elliptic or oblong shape with male (staminate) flowers at the base. Pistillate scales are tawny with a green center, apex acuminate or with a short, scabrous awn. Perigynia are rounded in cross-section, inflated, and widely radiating, the proximal reflexed, 5.8-9.7 x 1.9-3.3 mm. Beak (2-3 mm long) is usually smooth and abrupt. Achene is slender with an ellipsoid-trigynous shape. Style is persistent and strongly sinuous or abruptly bent.

Species appears similar to Cat-tail Sedge (*Carex typhina*), but the style in Cat-tail Sedge is deciduous and straight, it is not bent or strongly curved like Squarrose Sedge. Preferred habitat is reportedly slightly drier than Cat-tail Sedge habitat.

**Habitat:**

Species occurs in swamps, wet woods, meadows, forested wetlands, ditches, and stream banks.

**Flowering Period:**

Flowers present from June to August.

**Comments:**

Squarrose Sedge has an Obligate (OBL) wetland ranking.

**References:**

Angelo, R. and D. E. Boufford. 2007. Atlas of the Flora of New England: Cyperaceae. *Rhodora* 109:237-360.

Flora of North America Editorial Committee. 2002. Flora of North America. Volume 23: *Magnoliophyta: Commelinidae (in part): Cyperaceae*. Oxford University Press, New York. (pg. 518-519)

Haines, Arthur. 2011. *Flora Novae Angliae*. Yale University Press, New Haven, CT. (pg. 145)

Gleason, Henry A., and Arthur Cronquist. 1993. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2<sup>nd</sup> Edition. The New York Botanical Garden, Bronx, NY. (pg. 735)

Holmgren, Noel H., et al. 1998. The Illustrated Companion to Gleason and Cronquist's Manual – Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden, Bronx, NY. (pg. 687)

Standley, Lisa A. 2011. Field Guide to Carex of New England. A Special Publication of the New England Botanical Club, Harvard University Herbaria, Cambridge, MA. (pg. 12)

**Web Sources:**

USDA Natural Resources Conservation Service – PLANTS Profile for Squarrose Sedge (*Carex squarrosa*). <http://www.plants.usda.gov>.

USGS Northern Prairie Wildlife Research Center – Squarrose Sedge (*Carex squarrosa*). <http://www.npwrc.usgs.gov/resource/plants/floramw/species/caresqua.htm>.

June 24, 2014

**Common Name:** Low Frostweed      **Scientific Name:** *Crocanthemum propinquum*

**Family:** Cistaceae (Rockrose Family)

**Connecticut Status:** Threatened      **Federal Status:** Not Listed Federally

**Description:**

Low Frostweed is a perennial species with five showy, bright yellow petals on the petaliferous or chasmogamous flowers. Stems are erect, solitary, 1-3 dm tall, and arise from a creeping rhizome. Numerous apetalous or cleistogamous flowers are produced later in the season. Inflorescence is a terminal cluster of 2 to 6 flowers. Leaves are alternate, linear-spatulate to oblong-linear in shape, 1-3 cm long. Fruit is a capsule with many seeds (12-15) in open chasmogamous flowers. Smaller capsules with few seeds (1-2) develop from the cleistogamous flowers.

Synonym is *Helianthemum propinquum*.

**Habitat:**

Species occurs in dry, sandy soils of open woods, roadsides, clearings, dry fields, and sandplains.

**Flowering Period:**

Flowering period is mid-May – June for petaliferous flowers. Apetalous flowers later in season.

**Comments:**

Low Frostweed does not have an ACOE wetland ranking.

**References:**

Gleason, Henry A., and Arthur Cronquist. 1993. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2<sup>nd</sup> Edition. The New York Botanical Garden, Bronx, NY. (pg. 155)

Haines, Arthur. 2011. *Flora Novae Angliae*. Yale University Press, New Haven, CT. (pg. 526-527).

Holmgren, Noel H., et al. 1998. The Illustrated Companion to Gleason and Cronquist's Manual – Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden, Bronx, NY. (pg. 140)

New York Natural Heritage Program. 2013. NY NHP Conservation Plant Guide – Early Frostweed (*Crocanthemum propinquum*). New York Natural Heritage Program, Albany, NY.

**Web Sources:**

USDA Natural Resources Conservation Services – PLANTS Profile for Low Frostweed (*Crocanthemum propinquum*). <http://www.plants.usda.gov>.

June 24, 2014

## **Appendix G**

### **Plant List**



**Inventory of Higher Vascular Plant Species**  
**Tennessee Gas Pipeline Company, LLC**  
**Connecticut Expansion Project**  
**Towns of Suffield and East Granby, Hartford County, Connecticut**

Higher vascular plant species recorded during the CT Expansion Project surveys include:

Common Name	Scientific Name	Status <sup>a</sup>	CT Protection
<b>Trees:</b>			
Red Maple	<i>Acer rubrum</i>	N	-
Sugar Maple	<i>Acer saccharum</i>	N	-
Yellow Birch	<i>Betula alleghaniensis</i>	N	-
Black Birch	<i>Betula lenta</i>	N	-
Gray Birch	<i>Betula populifolia</i>	N	-
Pignut Hickory	<i>Carya glabra</i>	N	-
Shagbark Hickory	<i>Carya ovata</i>	N	-
American Beech	<i>Fagus grandifolia</i>	N	-
White Ash	<i>Fraxinus americana</i>	N	-
White Walnut	<i>Juglans cinerea</i>	N	-
Cultivated Apple	<i>Malus pumila</i>	E	-
Hop-hornbeam	<i>Ostrya virginiana</i>	N	-
White Spruce	<i>Picea glauca</i>	N	-
White Pine	<i>Pinus strobus</i>	N	-
Sycamore	<i>Platanus occidentalis</i>	N	-
Eastern Cottonwood	<i>Populus deltoides</i>	N	-
Trembling Aspen	<i>Populus tremuloides</i>	N	-
Eastern Black Cherry	<i>Prunus serotina</i>	N	-
White Oak	<i>Quercus alba</i>	N	-
Swamp White Oak	<i>Quercus bicolor</i>	N	-
Scarlet Oak	<i>Quercus coccinea</i>	N	-
Northern Red Oak	<i>Quercus rubra</i>	N	-
Sassafras	<i>Sassafras albidum</i>	N	-
Basswood	<i>Tilia americana</i>	N	-
Tulip-tree	<i>Liriodendron tulipifera</i>	N	-
American Elm	<i>Ulmus americana</i>	N	-
<b>Shrubs:</b>			
Speckled Alder	<i>Alnus incana</i> spp. <i>rugosa</i>	N	-
Shadbush	<i>Amelanchier</i> sp.	N	-
Japanese Barberry	<i>Berberis thunbergii</i>	E	-
Common Buttonbush	<i>Cephalanthus occidentalis</i>	N	-
Autumn Olive	<i>Elaeagnus umbellata</i>	E	-
Witch-hazel	<i>Hamamelis virginiana</i>	N	-
Common Winterberry	<i>Ilex verticillata</i>	N	-
Sheep-laurel	<i>Kalmia angustifolia</i>	N	-
Spicebush	<i>Lindera benzoin</i>	N	-
Tatarian Honeysuckle	<i>Lonicera tatarica</i>	E	-
Staghorn-sumac	<i>Rhus hirta</i>	N	-
Multiflora Rose	<i>Rosa multiflora</i>	E	-
Black-cap Raspberry	<i>Rubus occidentalis</i>	N	-
Common Blackberry	<i>Rubus allegheniensis</i>	N	-

**Inventory of Higher Vascular Plant Species**  
**Tennessee Gas Pipeline Company, LLC**  
**Connecticut Expansion Project**  
**Towns of Suffield and East Granby, Hartford County, Connecticut**

Common Name	Scientific Name	Status <sup>a</sup>	CT Protection
<b>Shrubs:</b>			
Common Elderberry	<i>Sambucus nigra</i> ssp. <i>canadensis</i>	N	-
Meadowsweet	<i>Spiraea alba</i> var. <i>latifolia</i>	N	-
Stepplebush	<i>Spiraea tomentosa</i>	N	-
Silky Dogwood	<i>Swida amomum</i>	N	-
Lowbush Blueberry	<i>Vaccinium angustifolium</i>	N	-
Highbush Blueberry	<i>Vaccinium corymbosum</i>	N	-
Arrow-wood	<i>Viburnum dentatum</i>	N	-
<b>Vines:</b>			
Asian Bittersweet	<i>Celastrus orbiculatus</i>	E	-
Virginia Creeper	<i>Parthenocissus quinquefolia</i>	N	-
Swamp Dewberry	<i>Rubus hispidus</i>	N	-
Poison Ivy	<i>Toxicodendron radicans</i>	N	-
Summer Grape	<i>Vitis aestivalis</i>	N	-
Fox Grape	<i>Vitis labrusca</i>	N	-
River Grape	<i>Vitis riparia</i>	N	-
<b>Clubmosses and Horsetails:</b>			
Tree Clubmoss	<i>Dendrolycopodium obscurum</i>	N	-
Field Horsetail	<i>Equisetum arvense</i>	N	-
<b>Ferns:</b>			
Hay-scented Fern	<i>Dennstaedtia punctilobula</i>	N	-
Sensitive Fern	<i>Onoclea sensibilis</i>	N	-
Interrupted Fern	<i>Osmunda claytoniana</i>	N	-
Royal Fern	<i>Osmunda regalis</i>	N	-
Cinnamon Fern	<i>Osmundastrum cinnamomea</i>	N	-
New York Fern	<i>Parathelypteris noveboracensis</i>	N	-
Christmas-fern	<i>Polystichum acrostichoides</i>	N	-
Marsh Fern	<i>Thelypteris palustris</i>	N	-
<b>Grasses:</b>			
Bentgrass	<i>Agrostis</i> sp.	-	-
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	E	-
Canada Bluejoint	<i>Calamagrostis Canadensis</i>	N	-
Orchard Grass	<i>Dactylis glomerata</i>	E	-
Deer-tongue Grass	<i>Dichanthelium clandestinum</i>	N	-
Fescue	<i>Festuca</i> sp.	-	-
Rattlesnake Grass	<i>Glyceria canadensis</i>	N	-
Fowl Meadow Grass	<i>Glyceria striata</i>	N	-
Rice Cut Grass	<i>Leersia oryzoides</i>	N	-
Reed Canary Grass	<i>Phalaris arundinacea</i>	N	-
Timothy	<i>Phleum pratense</i>	E	-

**Inventory of Higher Vascular Plant Species**  
**Tennessee Gas Pipeline Company, LLC**  
**Connecticut Expansion Project**  
**Towns of Suffield and East Granby, Hartford County, Connecticut**

Common Name	Scientific Name	Status <sup>a</sup>	CT Protection
<b>Sedges:</b>			
Awned Sedge	<i>Carex crinita</i>	N	-
Bladder Sedge	<i>Carex intumescens</i>	N	-
Wooly-fruited Sedge	<i>Carex lasiocarpa</i>	N	-
Hop Sedge	<i>Carex lupulina</i>	N	-
Sallow Sedge	<i>Carex lurida</i>	N	-
Pennsylvania Sedge	<i>Carex pensylvanica</i>	N	-
Squarrose Sedge	<i>Carex squarrosa</i>	N	SC
Awl-fruited Sedge	<i>Carex stipata</i>	N	-
Eastern Straw Sedge	<i>Carex cf straminea</i>	N	-
Tussock Sedge	<i>Carex stricta</i>	N	-
Fox Sedge	<i>Carex vulpinoidea</i>	N	-
Slender Spikesedge	<i>Eleocharis tenuis</i>	N	-
Dark-green Bullrush	<i>Scirpus atrovirens</i>	N	-
<b>Rushes:</b>			
Canada Rush	<i>Juncus canadensis</i>	N	-
Soft Rush	<i>Juncus effusus</i>	N	-
Path Rush	<i>Juncus tenuis</i>	N	-
<b>Forbs and Wildflowers:</b>			
Common Yarrow	<i>Achillea millefolium</i>	E	-
Great Ragweed	<i>Ambrosia trifida</i>	N	-
Groundnut	<i>Apios americana</i>	N	-
Indian Hemp	<i>Apocynum cannabinum</i>	N	-
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	N	-
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>	N	-
Swamp Milkweed	<i>Asclepias incarnata</i>	N	-
Devil's Pitchforks	<i>Bidens frondosa</i>	N	-
False Nettle	<i>Boehmeria cylindrica</i>	N	-
Water-hemlock	<i>Circuta maculata</i>	N	-
Wild Carrot	<i>Daucus carota</i>	E	-
Deptford Pink	<i>Dianthus armeria</i>	E	-
Daisy Fleabane	<i>Erigeron annuus</i>	E	-
Joe-Pye-Weed	<i>Eutrochium</i> sp.	N	-
Common Boneset	<i>Eupatorium perfoliatum</i>	N	-
Grass-leaved Goldenrod	<i>Euthamia graminifolia</i>	N	-
Wild Strawberry	<i>Fragaria virginiana</i>	N	-
Bedstraw	<i>Galium</i> sp.		
Teaberry	<i>Gaultheria procumbens</i>	N	-
Wild Geranium	<i>Geranium maculatum</i>	N	-
White Avens	<i>Geum canadense</i>	N	-
Hawkweed	<i>Hieracium</i> sp.	E	-
Common St. John's-wort	<i>Hypericum perforatum</i>	E	-
Spotted Touch-Me-Not	<i>Impatiens capensis</i>	N	-
Blueflag	<i>Iris versicolor</i>	N	-

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Common Name	Scientific Name	Status <sup>a</sup>	CT Protection
<b>Forbs and Wildflowers;</b>			
Ox-eyed Daisy	<i>Leucanthemum vulgare</i>	E	-
Round-headed Bush-clover	<i>Lespedeza capitata</i>	N	-
Canada Lily	<i>Lilium canadense</i>	N	-
Bird's-foot Trefoil	<i>Lotus corniculatus</i>	E	-
Seedbox	<i>Ludwigia alternifolia</i>	N	-
Starflower	<i>Lysimachia borealis</i>	N	-
Moneywort	<i>Lysimachia nummularia</i>	E	-
Whorled Loosestrife	<i>Lysimachia quadrifolia</i>	N	-
Purple Loosestrife	<i>Lythrum salicaria</i>	E	-
Canada Mayflower	<i>Maianthemum canadense</i>	N	-
Partridge-berry	<i>Mitchella repens</i>	N	-
Forget-Me-Not	<i>Myosotis scorpioides</i>	E	-
Common Evening Primrose	<i>Oenothera biennis</i>	N	-
Tall White Beard-tongue	<i>Penstemon digitalis</i>	N	-
Arrowleaf Tearthumb	<i>Persicaria sagittata</i>	N	-
English Plantain	<i>Plantago lanceolata</i>	E	-
Ragged-fringed Orchid	<i>Platanthera lacera</i>	N	-
Silver-leaved Cinquefoil	<i>Potentilla argentea</i>	E	-
Sulfur Cinquefoil	<i>Potentilla recta</i>	E	-
Old Field Cinquefoil	<i>Potentilla simplex</i>	N	-
Narrow-leaved Mountain-mint	<i>Pycnanthemum tenuifolium</i>	N	-
Virginia Mountain-mint	<i>Pycnanthemum virginianum</i>	N	-
Kidney-leaf Buttercup	<i>Ranunculus abortivus</i>	N	-
Black-eyed Coneflower	<i>Rudbeckia hirta</i>	E	-
Blue-eyed Grass	<i>Sisyrinchium cf angustifolium</i>	N	-
Carrion-flower	<i>Smilax herbacea</i>	N	-
Canada Goldenrod	<i>Solidago canadensis</i>	N	-
Smooth Goldenrod	<i>Solidago gigantea</i>	N	-
Early Goldenrod	<i>Solidago juncea</i>	N	-
Rough Goldenrod	<i>Solidago rugosa</i>	N	-
Skunk-cabbage	<i>Symplocarpus foetidus</i>	N	-
Tansy	<i>Tanacetum vulgare</i>	E	-
Tall Meadow-rue	<i>Thalictrum pubescens</i>	N	-
Rabbit-foot Clover	<i>Trifolium arvense</i>	E	-
Red Clover	<i>Trifolium pratense</i>	E	-
White Clover	<i>Trifolium repens</i>	E	-
Common Cat-tail	<i>Typha latifolia</i>	N	-
Wild Oats	<i>Uvularia sessilifolia</i>	N	-
False Hellebore	<i>Veratrum viride</i>	N	-
Blue Vervain	<i>Verbena hastata</i>	N	-
Common Mullein	<i>Verbascum thapsus</i>	E	-
Purple Vetch	<i>Vicia cracca</i>	E	-

a: N = Native Species      E = Exotic Species

State Status:    E = Endangered Species; T = Threatened Species; SC = Special Concern Species