

Connecticut Expansion Project

Invertebrate Habitat Assessment



Prepared for AECOM
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by

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March 31, 2015

Introduction: The Tennessee Gas Pipeline Company, LLC (Tennessee) is proposing construction of the Connecticut Expansion Project (the Project). Accordingly, Tennessee is filing an application seeking the issuance of a certificate of public convenience and necessity from the Federal Energy Regulatory Commission (Commission or FERC) for the construction and operation of the Project, in Albany County, New York, Berkshire and Hampden Counties, Massachusetts and Hartford County, Connecticut. The proposed Project involves the construction of two sections of new, 36-inch outside diameter (OD) pipeline looping totaling 1.35 miles in New York and 3.81 miles in Massachusetts, one section of new, 24-inch OD pipeline looping totaling 8.2 miles in Massachusetts and Connecticut (Figure 1), and appurtenant facilities, including main line valves (MLV), cathodic protection, and internal inspection device launchers and receivers. To the extent that it is practicable, feasible, and in compliance with existing law, Tennessee proposes to locate the pipeline loops within or adjacent to the right-of-way (ROW) associated with its existing pipeline designated as the 200 Line in New York and Massachusetts and the 300 Line in Connecticut.

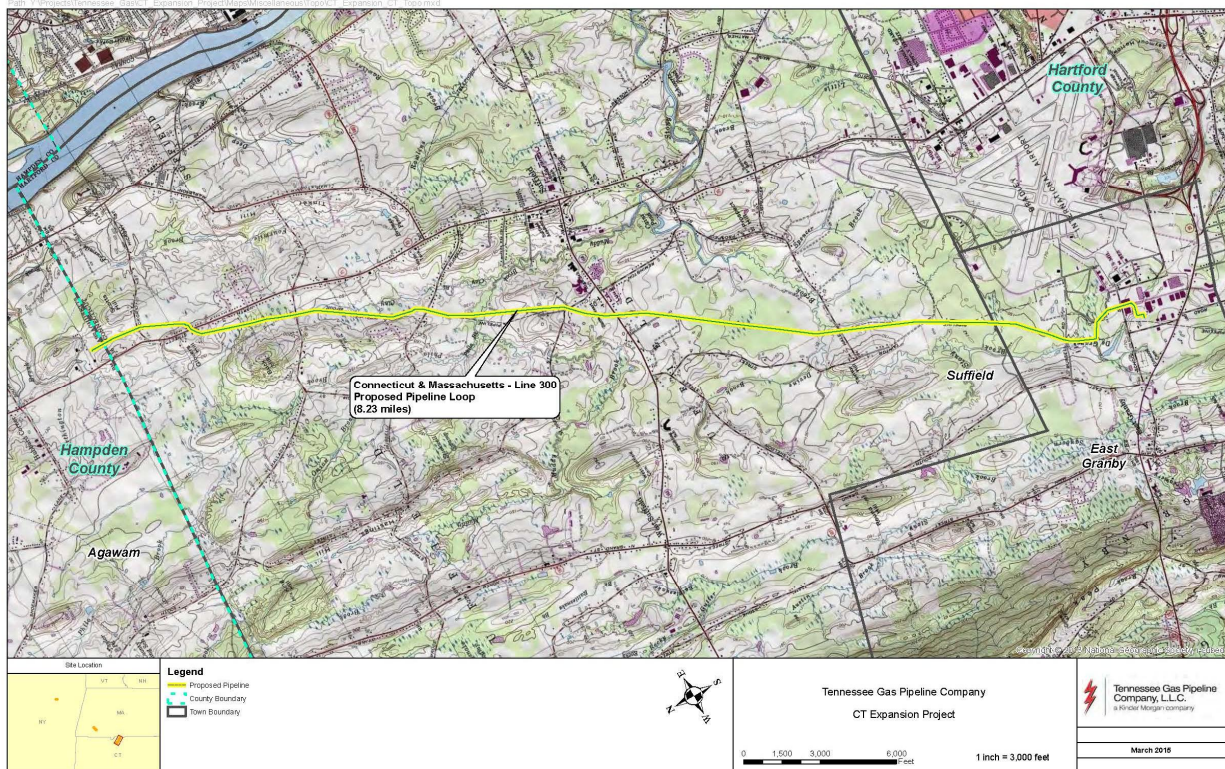


Figure 1. Connecticut Loop of the Connecticut Expansion Project (indicated in yellow), beginning in Agawam, MA and running south to East Granby, CT at Kripes Road. North is to the lower left.

In 2014, I was contacted by AECOM Inc. and their client (Tennessee) to carry out a habitat-based suitability survey for state-listed terrestrial invertebrates known from two locations proximate to the proposed pipeline expansion project areas (Figure 2). The State of

Connecticut’s Department of Energy and Environmental Protection (CT DEEP) identified ten invertebrates that had been recorded from the vicinity of the Project (Table 1).

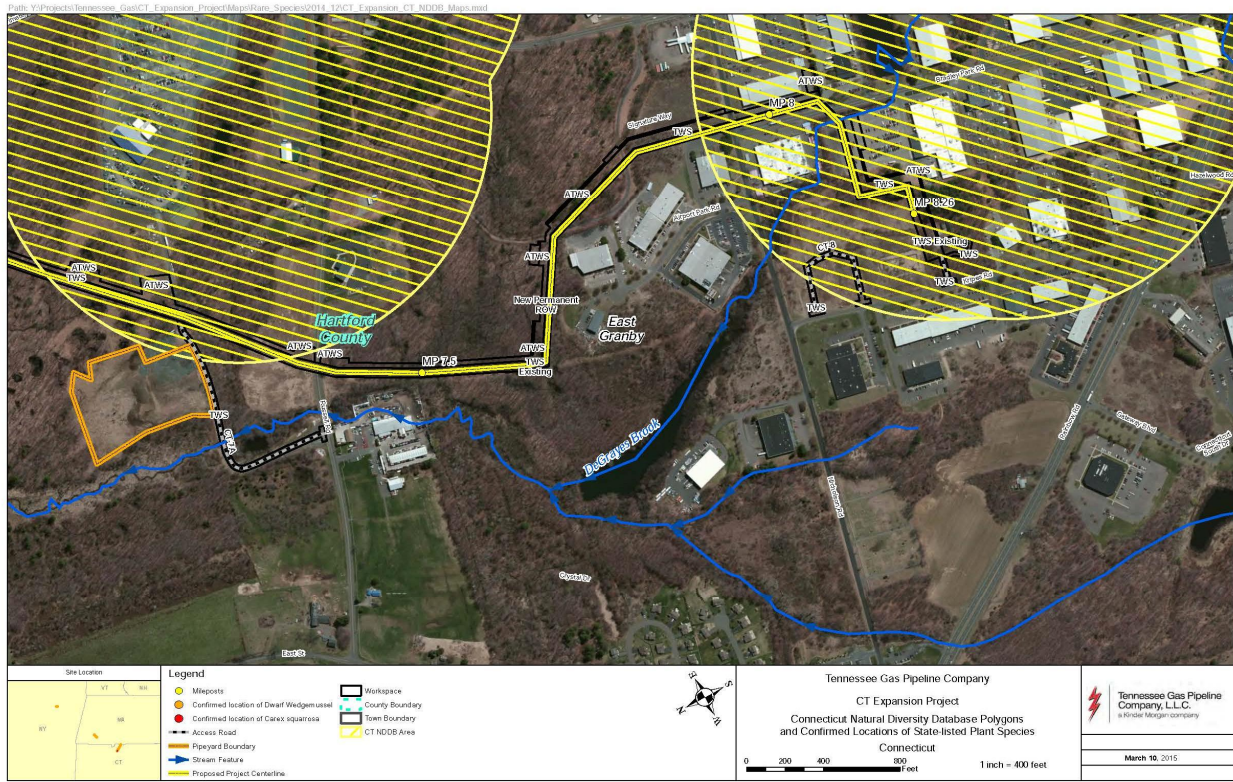


Figure 2. Southern end of the Project with the two polygons noted by CT-NDDB indicated by yellow cross hatching. More detailed maps are supplied as Figures 3-6 below. North is to the lower left.

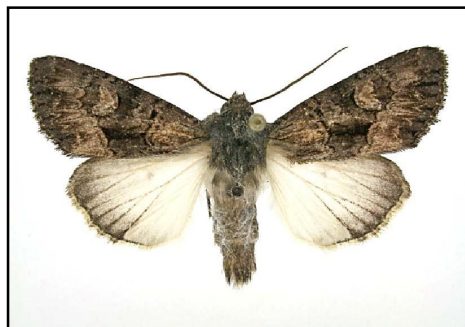
Area to be surveyed: For invertebrates, all of the Natural Diversity Database (NDDB) *hits* were in the vicinity of two portions of the Project, west of Bradley International Airport, indicated in Figure 2: one over Kripes Road and the other to the north of Russell Road, in East Granby, Connecticut. Additional NDDB polygons to the north, identified by CT DEEP, were not investigated as communications between NDDB and AECOM had identified invertebrate concerns as being limited to the polygons identified in Figure 2. Four detailed maps, showing the planned route of the pipeline in relation to the NDDB polygons appear in images 3-6 below.

Taxa of Conservation Interest: The ten state-listed species (Table 1) identified in the letter from Dawn McKay of the CT DEEP (Appendix 1) include six moths (my taxonomic specialty) and four carabid beetles. Eight are sandplain specialists. Presumably most, if not all of these were taken on sandplain and grassland communities about the runways and adjacent properties of Bradley International Airport in 2003 (Lowry and Wagner 2003). A brief synopsis of the known habitat, hostplants, and other biological requirements of each species follows.

Table 1. State-listed invertebrates identified by CT DEEP in November 2014—letter from NNDB Program reproduced as Appendix 1.

	Scientific Name	State Status
Moths (Lepidoptera)		
Burgess' Cutworm	<i>Apamea burgessi</i>	CT Species of Special Concern
Brown-bordered Geometer	<i>Eumacaria latiferrugata</i>	CT Species of Special Concern
Jointweed Flower Moth	<i>Schinia spinosae</i>	CT Species of Special Concern
Shrub Euchlaena Moth	<i>Euchlaena madusaria</i>	CT Species of Special Concern
Violet Dart Moth	<i>Euxoa violaris</i>	CT State Threatened
Phyllira Tiger Moth	<i>Grammia phyllira</i>	CT State Endangered
Beetles (Coleoptera)		
bombardier beetle	<i>Brachinus cyanipennis</i>	CT Species of Special Concern
Pine Barrens Tiger Beetle	<i>Cicindela formosa generosa</i>	CT Species of Special Concern
ground beetle	<i>Harpalus eraticus</i>	CT Species of Special Concern
ground beetle	<i>Tetragonoderus fasciatus</i>	CT Species of Special Concern

Species Synopses



***Apamea burgessi* (Burgess Cutworm) (Family Noctuidae).** This fall-flying owlet is listed as a Special Concern Species (CTDEP 2010). It occurs locally in grasslands from eastern Massachusetts south to New Jersey (Mikkola et al. 2009). It is known from a number of locations in the central and eastern areas of Connecticut: Mansfield Hollow-Windham Airport, Moody Road (LEGO Inc.) in Enfield, Simsbury Airport, Brickyard Road in Farmington, Toelles Road in Wallingford, Bradley International Airport, West

Thompson Lake, and most recently from Old Iron Mine Road area in Bloomfield. Forbes (1954) characterized the species as “Rare and local except along the coast.” We associate the moth with grasslands where little bluestem (*Schizachyrium scoparius*) grows in abundance. While the early stages are unknown (Mikkola et al. 2009), Mark Mello unearthed a larva from the roots of little bluestem in July 2009 that is believed to represent this species (David L. Wagner personal communication). I believe it will be delisted in 2015 by the CT-DEEP.

***Eumacaria latiferrugata* (Brown-bordered Geometer) (Family Geometridae).** The first Connecticut record for this handsome moth was made on July 2003 from Bradley International Airport (Windsor), where a summer of blacklight trapping produced only a single and worn individual. Multiple examples (n=6) from Milford Point indicate the species is established there. Even if the moth were established at Bradley, existing habitat around the



airport is too small and highly impacted to support a population of this moth without an active management program. The larvae feed on cherries, especially beach plum (*Prunus maritima*), pin or fire cherry (*P. pensylvanica*), and sand cherry (*P. pumila*). In the Northeast, the moth is associated with sandy habitats such as beach, dune, and inland sandplain habitats (Wagner et al. 2002). It should probably be elevated to a Threatened Species.



***Schinia spinosae* (Joint Weed Flower Moth)** (Family Noctuidae). This small, energetic moth is a denizen of coastal beaches, sand plains, and other open, dry, sandy habitats from Massachusetts to New Jersey. Connecticut populations are known from several beaches and inland sandplains of the Connecticut and Farmington River Valleys. The moth is known from Bradley International Airport (Lowrey and Wagner 2003). Details of the larval biology were regarded as unknown by Hardwick (1996), but

judging from the known hosts of closely-related species, adult nectaring preferences, and an evaluation of potential hosts in habitats where the moth is common, the host is believed to be jointweed (*Polygonella articulata*). Wagner et al. (2011) report the larval host as jointweed: an early successional, sand-loving plant that thrives in dunes and open sandplains.

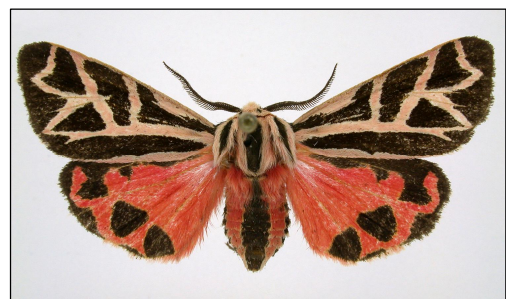


***Euchlaena madusaria* (Heath Euchlaena)** (Family Geometridae). This handsome moth is listed as a State Special Concern Species. It occurs from Massachusetts to North Carolina, west to Texas and Colorado (Forbes 1948). Prior to its discovery in Thompson (Wagner and Metzler 2011), it was known from just two sites in Connecticut: Bradley International Airport and the pine-oak barren below Mansfield Hollow Dam in Mansfield Hollow. It is closely associated with low heaths and in particular lowbush

blueberry (*Vaccinium angustifolium*).

***Grammia phyllira* (Phyllira Tiger Moth)** (Family Erebidae: Arctiinae). Although widespread in the East, occurring from Wisconsin to Maine southward to Florida and Texas (Forbes 1960, Covell 1984), this species is local and rare over much of the East Coast. It appears to be declining across much of its eastern range, perhaps due to the loss of agricultural in the region.

Presently it is known from only three localities in all of New England: Concord pitch pine-scrub oak barrens, Concord, NH; Westover Air Force Base Chicopee, MA; and Bradley International Airport (Windsor Locks, CT). It appears to a denizen of short stature grasslands. The moth is absent from many of Connecticut's grasslands including Windham Airport, Cytex Industries, Higganum Meadows, and Simsbury Airport. Prior to our discovery of the moth at Bradley International Airport (Lowrey and Wagner 2003) it was thought to be extirpated in Connecticut. It is presently listed as Endangered (CT-DEEP 2010).





***Brachinus cyanipennis* (Bombardier Beetle) (Family Carabidae)**

This is a widespread eastern species found in flood-plain forests as well as the borders of eutrophic marshes and ponds, along rivers, and in beaver lodges. It is also present at Bradley International Airport (Lowrey and Wagner 2003), but I don't recall that we sampled in any wet sites in 2003. The larvae of *B. cyanipennis* are ectoparasites of whirligig beetle (Gyrinidae: *Gyrinus sp.*) pupae (Larochelle & Lariviere 2003).

***Cicindela formosa* (Big Sand Tiger Beetle) (Family Carabidae).** This species inhabits Windsor soil (aeolian or windblown sand deposits). Its known range in Connecticut extends from colonies in the vicinity of Barkhamstead Reservoir east into Rhode Island. Its stronghold appears to be in the glacial sand deposits of Glacial Lake Hitchcock in the Central Valley of Connecticut where more than a dozen populations have been located. It is common at a couple locations at Bradley International Airport (Lowrey and Wagner 2003). Nearly all of the state's colonies are extremely small in extent and vulnerable to both development and succession.



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***Harpalus eraticus* (Ground Beetle) (Family Carabidae).** This is a widespread species east of the Rocky Mountains. Bousquet (2012) regards it to be a denizen of "open places: vacant fields, sand and gravel pits, dunes, usually on sandy, mostly dry soils." Lowrey and Wagner (2003) took four specimens of the beetle in their pitfall trap samples at Bradley International Airport. Like the Big Sand Tiger Beetle, it is a denizen of Windsor soil (aeolian or windblown sand deposits). (Photo Courtesy of <http://carabidae.org/taxa/eraticus-say-1823>).

***Tetragonoderus fasciatus* (Ground Beetle) (Family Carabidae).**

This is a widespread beetle in North America, occurring essentially coast to coast. William Krinsky the state's carabid authority had this to say about the species, "It has been collected many times along the CT River, Quinnipiac River, and other wet sandy places." It seems to be headed for delisting.



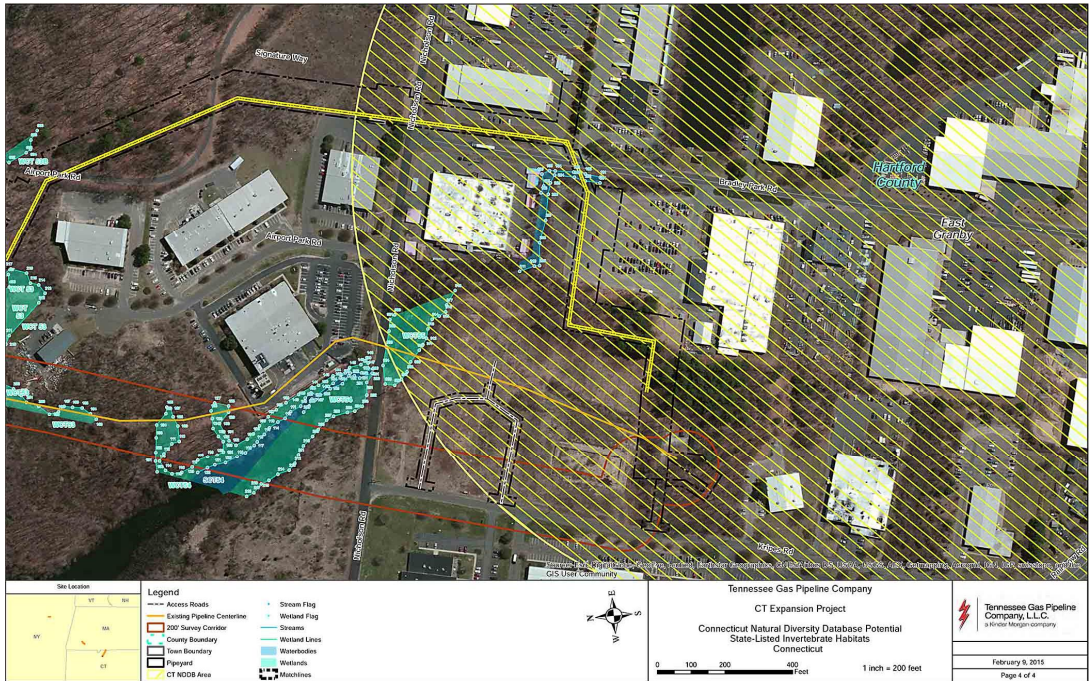


Figure 3. Connecticut Expansion Project (pipeline yellow) at Kripes Road East Granby, Connecticut with yellow crosshatching showing polygon for state-rare invertebrates. North is to the left.

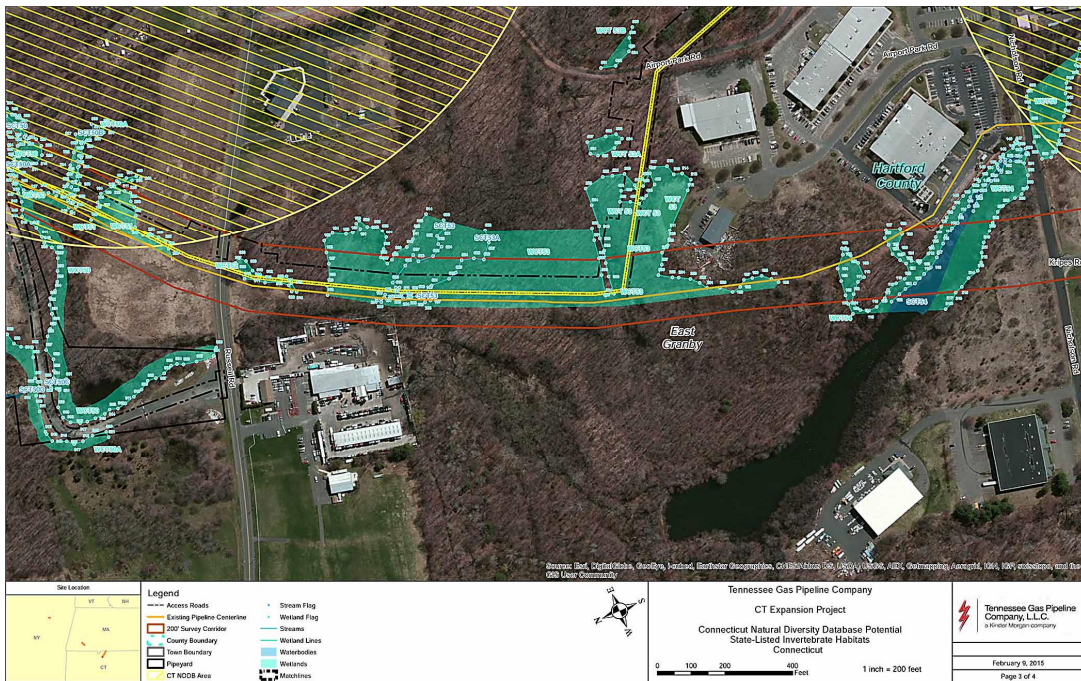


Figure 4. Connecticut Expansion Project (pipeline yellow) from Nicholson Road (right) to just north of Russell Road (East Granby, Connecticut) with yellow crosshatching showing second polygon identified as being proximate to locations for state-rare invertebrates. North is to the lower left.

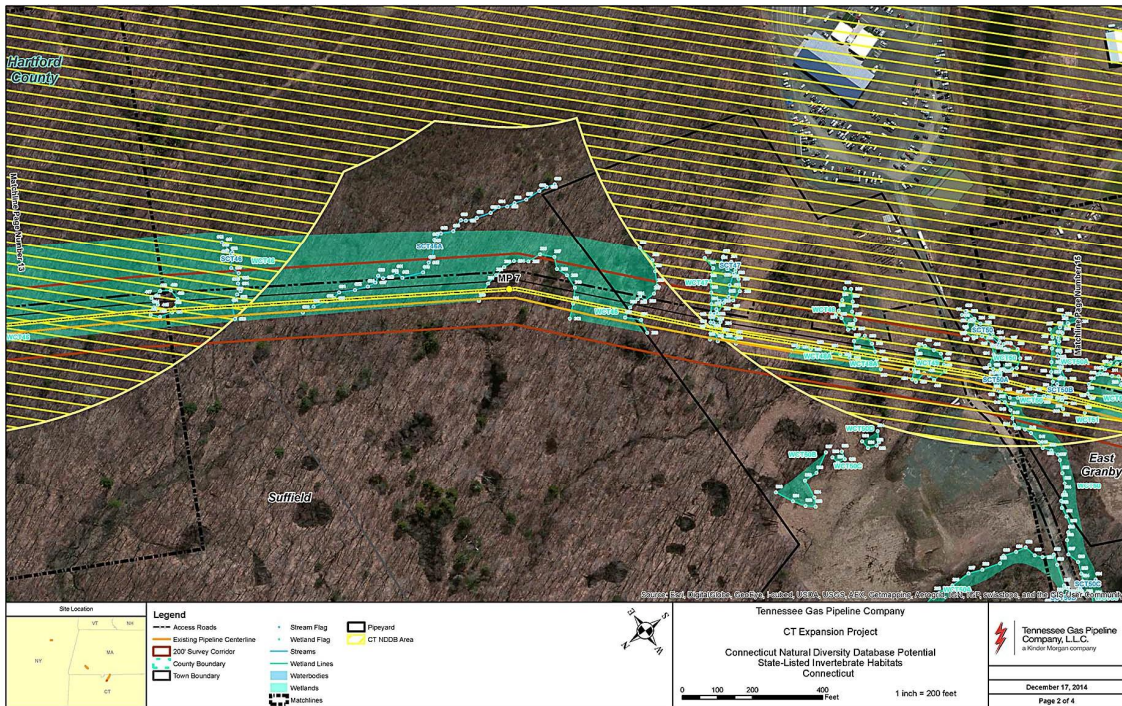


Figure 5. Connecticut Expansion Project (pipeline yellow) northwest of Perimeter Road (East Granby, CT), with yellow crosshatching showing polygon for state-rare invertebrates. North is to the lower left.

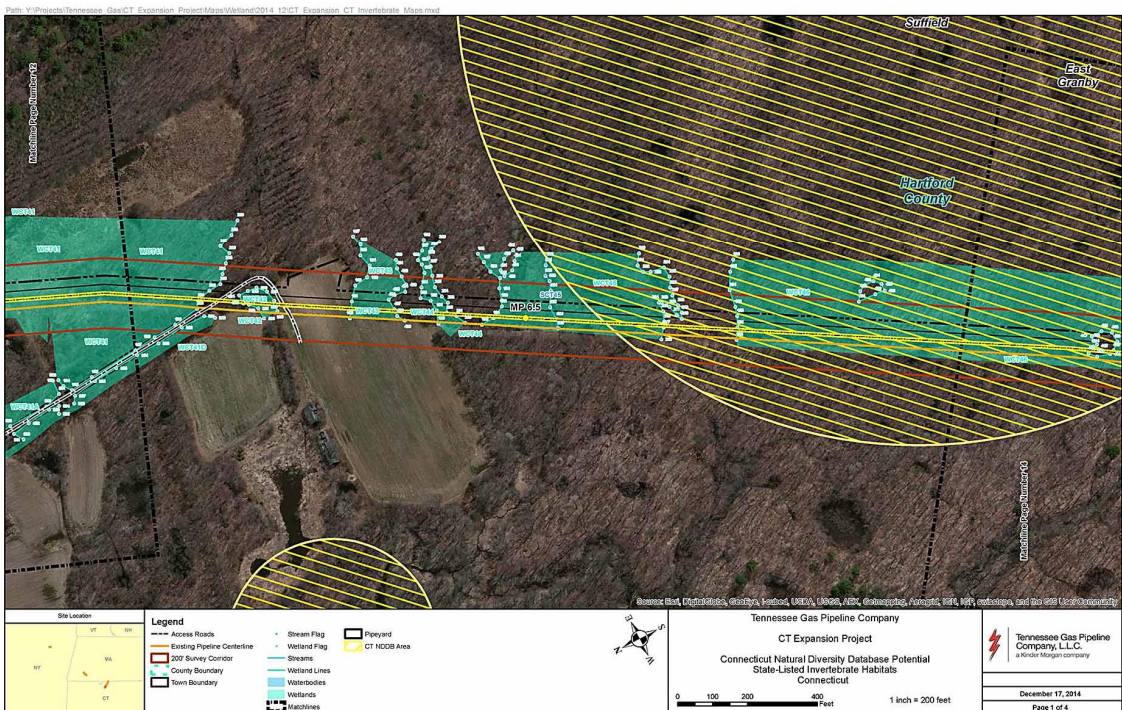


Figure 6. Connecticut Expansion Project (pipeline yellow) northwest of Perimeter Road, at north end of second invertebrate polygon with yellow crosshatching showing polygon for state-rare invertebrates (approx. Suffield Town line). North is to the lower left.

Site (Habitat) Assessment: The goal of my participation was to evaluate the suitability of the habitat along the pipeline for the ten state-listed species. No part of the effort was a collection-based survey, and visits occurred so late in the year (late September, early October) that few of the target species would have been detectable.

My assessment was based on the following:

- (1) two site visits;
- (2) review of project maps supplied by AECOM and the CT NDDDB;
- (3) an evaluation of soils and surficial geology;
- (4) characterization of plant community composition and especially plant structure, i.e., whether the sites are open versus overtopped by trees;
- (5) Google Earth imagery over the pipeline, including one virtual visit along the pipeline with the former state botanist, Ken Metzler;
- (6) consultations with Tim O'Sullivan (AECOM) about project construction and site hydrology;
- (7) interviews with Dr. William Krinsky (Yale University) and Michael Thomas (Connecticut Agricultural Experiment Station) familiar with the ten state-listed species.

(1) Site visits: I visited the site on 26 September, 2014 and again on 3 October, 2014 and walked much of the circa 1.8 mile portion of the Project proximate to CT-NDDDB mapped polygons both times. On both visits, I was accompanied by Tim O'Sullivan of AECOM. We met at Kripes Road, walked to the meter station where the expansion will start, then drove to Russell Road, walked southward for about 50 m and then reversed course and walked northward to the end of the Project area (short of the corn fields south of Taintor Street in Suffield).

I did not walk the south end of the pipeline, except in the immediate vicinity of the meter station, because the south end of the route was modified in February 2015 (from that proposed in the fall 2014 when I made my two on-site visits). I have been able to study GoogleEarth imagery and soil maps for the first 4425 feet of the proposed routing, i.e., east to Bradley Park Road, north past Nicholson Road, around Coors-Tek property, and through the mesic to wet forested area south of Russell Road.

(2) Maps of the project were reviewed both prior to and following the two site visits.

(3) Soil maps for the site (Figure 7) were reviewed online and with Ken Metzler during an office visit. All of the moths and three of the beetles are closely tied to sandy soils as described in the Species Synopses on pages 4-6. The only exception being *Brachinus cyanipennis* which is found in floodplain forests as well as along the borders of eutrophic marshes and ponds, and along rivers.

Over 90% of the soils along the 1.5-mile portion of the pipeline that I walked were wet clay-silt soils. Sandy soils suitable for the majority of the sandplain taxa are found along Kripes Road, adjacent to the meter station at the southern end of the Project.

(4) The vegetation of the site was often disturbed, mowed, beneath closed forest canopy, or otherwise inappropriate for all but one of the state-listed species. Below, I group and discuss sections of the Project from south to north.

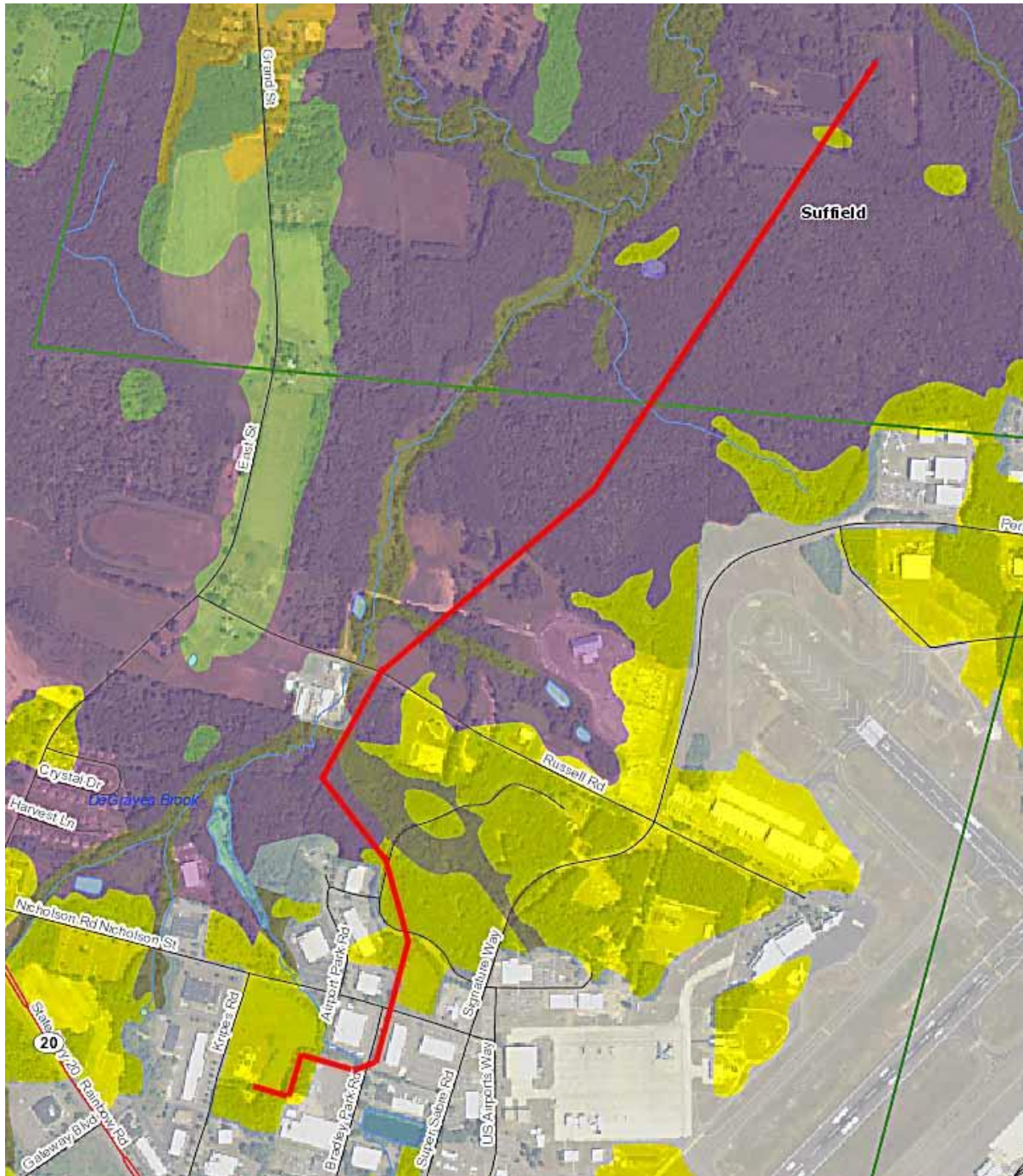


Figure 7. CT-Eco Map (<http://ctecoapp1.uconn.edu/advancedviewer/>) showing soil parent materials: yellow = glaciofluvial soils (mostly sand); pale green = lodgement till (sand and gravel); pink-lavender = glaciolacustrine (mostly clays).

South End (Kripes Road) (Figures 9, 10). At the south end of the Project east of Kripes Road there is a sandy field with little bluestem and goldenrod, owl clover (*Lespedeza*), and an abundant small-white-flowered aster. There was little open sand. The field appears to be too vegetated and too small to support most rare sandplain and dune species that are listed in Table 1. For example, both *Cicindela formosa* and *Schinia spinosae* tend to occupy expansive sand flats and dunes, mostly free of plants. It may support one or two of the ground beetles (carabids); perhaps, also *Apamea burgessi*, but I believe this moth, a little-bluestem grass associate, is going to be dropped from the new state list because it has proven to be fairly widespread in sandy, open areas of the state.

While this is the most likely section of the pipeline to support state-listed invertebrates, given the sandy nature of the surface soils (see Figure 7) and the early successional (sunny) nature of the habitat (Figures 8-10), I also hasten to add the area has been much disturbed, supports many invasives (yarrow, mullein, bedstraw, spotted knapweed), is small in extent, and is surrounded by industrial development--I question its conservation value. Moreover, historical aerial imagery suggests that it has been an area that has been much disturbed over its recent history.



Figure 8. Open field at south end of Project, east of Kripes Road. While the entire area is underlain with sandy soils, only that portion under the “y” in sandy soils in this image had open sand free of vegetation.



Figures 9-16. Images from 3 October site visit (with Tim O’Sullivan). **9, 10** Sandy field along Kripes Road. **11, 12** Overgrown field north of Nicholson Road. **13** Mowed gas pipeline north of Russell Road. **14**, Wetland in vicinity of vernal pools (41°56’58”N, 72°41’55”W). **15, 16** Woodlands sites typical of the gas pipeline north of Russell Road.

Nicholson Road north to Russell Road (Figures 11, 12). This section was deemed unacceptable for state-listed species. The woodland east of DeGraves Pond has three soil types represented: glaciofluvial soils (mostly sand); pale green = lodgement till (sand and gravel); pink-lavender = glaciolucrisine (mostly clays) (see Fig. 7), but very little sand, and more importantly, none of which was under closed canopies. This section struck me as being too wet and shady to be suitable for the state-listed invertebrates, with the exception of *Brachinus cyanipennis*, which sometimes inhabits wet, forested habitats.

North of Russell Road to end of survey area (Figures 13-16). I walked a 0.85 mile section of the pipeline that runs northeastward from Russell Road—past the section of the Project that intersects NDDDB polygons (Figures 5 and 6). The soils are entirely mesic to wet glaciolacustrine silts and clays. Three creeks cross the pipeline and several vernal pools occur in the low-lying woodlands along this section of the pipeline. The dominance of red maple along this portion of the Project pipeline corridor additionally speaks to the mesic to wet nature of this section. The forest canopy is partially to completely closed--much too forested to be appropriate habitat for all but *Brachinus cyanipennis*. Regardless, this is an abundant forest type in Connecticut and is regarded as being of only modest conservation value (with the exception of the vernal pools: these looked suitable for *Ambystoma*).

Summary Evaluation: With one exception (*Brachynis cyanipennis*), the state-listed taxa in the listed in Table 1 are sandplain invertebrates that thrive in open, sandy habitats with low vegetation. Records of all ten species that were the focus of this report were first reported from East Granby during 2003 when Jessica Lowry and David Wagner carried out an invertebrate survey to document what insect prey were available to grasshopper sparrows and other imperiled grassland birds, in and about the runways of Bradley International Airport, where vegetation is highly managed, and rarely allowed to grow to more than 6". The habitat along the gas pipeline, by contrast, was mostly forested, and largely over glaciolacustrine silts and clays, and considerably wetter than those of the airport.

Only the small field at the southern end of the Project area, east of Kripes Road was open and sandy enough to be suitable for most of the state-listed taxa. But I regard the field shown in Figure 8 to be too small, too disturbed, too impacted by introduced species, and too insularized by adjacent industrial land uses to be a viable habitat for state rare species.

It is possible that four of the state-listed species—all Special Concern—are present along the gas line: *Apamea burgessi*, *Brachynis cyanipennis*, *Harpalus eraticus*, and *Tetragonoderus fasciatus*. The first and last of these have been found to be more common than once thought and should be dropped from the state list. My guess is that *Harpalus* prefers more open, sandy habitats and is not a resident breeder anywhere along the gas line. *Brachinus cyanipennis* sometimes occupies undistinguished habitats. Moreover, its biology and preferred breeding habitats are unknown, so I am not certain what if any actions could be taken on its behalf.

Given the degree of uncertainty regarding what constitutes critical habitat for the three Special Concern ground beetles, the mostly forested habitat, prevalence of silty-clay glaciolacustrine soils (not Windsor sands), absence of high quality habitat, small amount of land effected, prevalence of invasives along the length of the gas pipeline, degree of industrialization in the

vicinity of Kripes Road, and the fact that the line will be underground, I don't believe appreciable mitigation measures are warranted.

If I were to make recommendations, I would suggest restoration and management efforts be focused on the Kripes Road site and its glaciofluvial soils. No sand should be removed from the project site. Several flat open sand areas should be left unvegetated upon completion of construction. Sites with relief, subject to water erosion should be stabilized and seeded with dry-season grasses (especially little bluestem) following construction.

Qualifications of the Principal Investigator: I am a Ph. D. entomologist at the University of Connecticut with a specialty in Lepidoptera. I sit on the state's Advisory Committee for Endangered and Threatened Invertebrates and have been actively engaged in environmental assessments linked to invertebrate conservation since 1982. I have published more than 150 papers on Lepidoptera and other insects. In addition to the above, I have authored several books including one (Schweitzer et al. 2011) focused on rare species of Lepidoptera in eastern North America, and two books that include species accounts relevant to the listed taxa (Wagner et al. 2002, 2011). A complete list of my publications is attached as Appendix 2.

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Appendix 1. Letter from Dawn McKay (CT-DEEP) dated 23 November, 2014.



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
NDDDB 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. 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>
Animals		
<i>Alasmidonta heterodon</i>	Dwarf wedge mussel	E
<i>Alasmidonta 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 euchaena	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 erraticus</i>	Ground beetle	SC
<i>Heterodon platirhinos</i>	Eastern hognose snake	SC
<i>Passerculus sandwichensis</i>	Savannah sparrow	SC
<i>Pooecetes 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
Natural Communities		
<i>Sand barren</i>		
Plants		
<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

E = Endangered, T = Threatened, SC = Special Concern, SC* = Special Concern, Presumed Extirpated

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Appendix 2. Curriculum Vitae for David L. Wagner

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Education:

B. S. Degree: December 1978, magna cum laude, plant pathology with minor in entomology,
Colorado State University, Fort Collins, CO.

Ph. D. Degree: December 1985, Entomology, Univ. of California, Berkeley, CA.

Professional Experience:

6/79 to 3/82 Graduate Research & Teaching Assistantships, Univ. of California, Berkeley.
& 9/83 to 6/85
10/82 to 9/83 Assistant Curator, Essig Museum of Entomology, Univ. of California, Berkeley.
1/86 to 9/86 Staff Research Assistant, Univ. of California, Berkeley.
9/86 to 5/87 Tilton Fellow, Calif. Academy of Sciences, San Francisco.
5/87 to 9/88 Assistant Research Professor of Entomology, Univ. of Vermont, Burlington.
9/88- Research Associate, Museum of Comparative Biology, Harvard Univ.
9/88-9/95 Assistant Professor of Ecology and Evolutionary Biology, Univ. of Connecticut,
Storrs.
9/95-4/07 Associate Professor of Ecology and Evolutionary Biology, Univ. of Connecticut,
Storrs.
4/07- Professor of Ecology and Evolutionary Biology, Univ. of Connecticut, Storrs.

Honors and Awards:

Elected to Phi Beta Kappa, 1978.
Peiterson Scholarship, Botany Dept., Colo. St. Univ., 1978.
Earle C. Anthony Fellowship, Univ. of California, Berkeley, 1979-80.
Regent's Fellowship, Univ. of California, Berkeley, 1980-81.
Regent's Fellowship, Univ. of California, Berkeley, 1981-82.
J. A. Comstock Award for outstanding student contributor, Lepidopterists' Soc., 1982.
J. A. Comstock Award for outstanding student contributor, Lepidopterists' Soc., Pacific Slope,
1983.
Power S. Messenger Memorial Award, Entomology Dept., U.C. Berkeley, 1984.
Student Paper Presentation Award, 2nd place, AAAS, Pacific Section, Entomological Symposium
sponsored by the Pacific Coast Entomol. Soc., 1984.
Elected to Sigma Xi, 1984.
Snodgrass Memorial Research Award, Entomol. Soc. Am., 1984
Tilton Fellowship, California Academy Sciences, 1986-1987.
National Outdoor Book Award for Best Nature Guidebook, 2006
David Blick Science Education Award, Neag School of Education, University of Connecticut,
2007

Professional Societies:

Association for Zoological Nomenclature	Sigma Xi
Entomological Society of America	Society of Systematic Biologists
Lepidopterists' Society	Willi Hennig Society
New York Entomological Society	Xerces Society

Society Involvement:

Lepidopterists' Society, Executive Council Members-at-large Committee, 1989-1992
Entomological Society of America, Standing Committee on the National Science Medal, 1990-1993; Chair 1992-1993
Entomological Society of America, Section A Chairman (Systematics, Morphology, and Evolution), Entomological Society of America, 1992-1993
Connecticut Entomological Society, Vice-president Elect, 1990-1991.
New York Entomological Society, Publications Committee, 1991-
Psyche, Associate Editor, Psyche, 1991-
Lepidopterists' Society, Karl Jordan Medal Committee Representative, 1992-1995
Society of Systematic Biologists, Council Member, 1993-1996
Cambridge Entomological Society, President, 1995-1996
Lepidopterists' Society, Associate Editor, 1996-
Society of Systematic Biologists, Endowment Committee, 1996-1998
Entomology Collection Network Steering Committee, 1996-1999
Organization for Tropical Studies, Board of Delegates, 1997-
Lepidopterists' Society, Vice-President Elect, 2001-2002
Discover Life in America, elected Board Member (DLIA is the steering entity for the "All Taxa Biological Inventory," being carried out in the Great Smoky Mtns. Nat. Park), 2001-
Discover Life in America, Vice-chair 2004-2007
Thomas Say Award Committee, Chair, Entomological Society of America, 2001-2003
Wedge Entomological Foundation, elected Director, 2002-
Lepidopterists' Society, Membership Committee, 2004-
New York Entomological Society, Associate Editor, 2005-
Entomological Society of America, Associate Editor for Annuals, 2006-2008
Lepidopterists' Society, Conservation Committee, 2006-

Publications

Dissertation:

Wagner, D. L. 1985. The biosystematics of the Holarctic Hepialidae, with special emphasis on the *Hepialus californicus* species group. Ph. D. Dissertation. University of California, Berkeley, 395.

Books:

1. Wagner, D. L., V. Giles, R.C. Reardon, and M. L. McManus. 1998. *Caterpillars of Eastern Forests*. USFS Technology Transfer Bulletin, FHTET-96-34. USDA Forest Service, Morgantown, West Virginia. 113 pp.

2. Wagner, D. L., D. C. Ferguson, T. L. McCabe, and R. C. Reardon. 2002. *Geometroid Caterpillars of Northeastern and Appalachian Forests*. USFS Technology Transfer Bulletin, FHTET-2001-10. USDA Forest Service, Morgantown, West Virginia. 239 pp.
3. Wagner, D. L. 2005. *Caterpillars of Eastern North America: A Guide to Identification and Natural History*. Princeton University Press. Princeton, New Jersey. 512 pp.
4. O'Donnell, L.F. Gall, and Wagner, D.L. (eds.). 2007. *The Connecticut Butterfly Atlas*. Connecticut Department of Environmental Protection, Hartford, CT. 368 pp.
5. Wagner, D. L., D. F. Schweitzer, J. B. Sullivan, and R. C. Reardon. 2011. *Owlet Caterpillars of Eastern North America*. Princeton University Press. Princeton, New Jersey. 576 pp.
6. Schweitzer, D. F., M. C. Minno, and D. L. Wagner. 2011. *Rare, Declining, and Poorly Known Butterflies and Moths (Lepidoptera) of Forests and Woodlands in the Eastern United States*. U.S. Forest Service, Forest Health Technology Enterprise Team, FHTET-2011-01. USDA Forest Service, Morgantown, West Virginia. 517 pp.

Popular Books:

1. Zim, H. S. and C. Cottam revised by J. Latimer, K.S. Nolting, and D. L. Wagner. 2000. *The Golden Guide to Insects: A Guide to Familiar American Insects*. St. Martin's Press, New York. St. Martin's Press, New York. 160 pp.
2. Sharpe, P. with R. S. Lewis, D. L. Wagner, and C. Lee. 2013. *Trap Rock Ridges of Connecticut: Natural History and Land Use*. Connecticut College Arboretum and Connecticut Department of Energy and Environmental Protection. 57 pp.

Refereed Papers:

1. Reeves, F. B., D. L. Wagner, T. Moorman, and J. Kiel. 1979. The role of endomycorrhizae in revegetation practices in the semi-arid West. I. A comparison of incidence of mycorrhizae in severely disturbed vs. natural environments. *Amer. J. Bot.* 66:6-13.
2. Kubo, I., T. Matsumoto, D. L. Wagner, and J. N. Shoolery. 1985. Isolation and structure of hepialone; principal component from male sex scales of *Hepialus californicus* Bdv. *Tetra. Let.* 26:563-566.
3. Wagner, D. L. and S. A. Cameron. 1985. *Bombus bifarius* foraging at aphid honeydew (Apidae). *Pan-Pacific Entomol.* 61:266.
4. Wagner, D. L. 1985. First California record and confirmation of a rosaceous hostplant for *Eriocrania* (Lepidoptera: Eriocraniidae). *J. Lepid. Soc.* 39:60-61.
5. Wagner, D. L. 1985. Biology and description of the larva of *Dicymolomia metaliferalis*: a case-bearing Glaphyriine (Lepidoptera: Pyralidae). *J. Lepid. Soc.* 39:39-47.
6. Wagner, D. L. 1987. Elachistidae. pp. 383-85. In F. W. Stehr [ed.], *An Introduction to Immature Insects of North America*. Kendall-Hunt Publishing Co., Dubuque, Iowa.
7. Wagner, D. L. 1987. Hepialidae. pp. 347-349. In F. W. Stehr [ed.], *An Introduction to Immature Insects of North America*. Kendall-Hunt Publishing Co., Dubuque, Iowa.
8. Wagner, D. L. 1987. A new *Microcalyptris* species from California (Lepidoptera: Nepticulidae). *Pan-Pacific Entomol.* 63:278-283.
9. Wagner, D. L. and J. A. Powell. 1988. A new *Prodoxus* from *Yucca baccata*: first report of a leaf-mining prodoxine (Lepidoptera: Prodoxidae). *Ann. Entomol. Soc. Am.* 81:547-553.

10. Whitfield, J. B. and D. L. Wagner. 1988. Patterns and host ranges within the parasitoid genus *Pholetesor* Mason (Hymenoptera: Braconidae). *Environ. Entomol.* 17:608-615.
11. Wagner, D. L. 1988. The taxonomic status of *Korscheltellus* Börner, 1925, in North America (Lepidoptera: Hepialidae). *J. New York Entomol. Soc.* 96:345-354.
12. Wagner, D. L. and N. B. Tindale. 1988. An appraisal of *Gazoryctra* Hubner (Hepialidae), with the description of a new species from Arizona. *J. Lepid. Soc.* 42:204-212.
13. McCabe, T. L. and D. L. Wagner. 1989. The biology of *Sthenopsis auratus* (Lepidoptera: Hepialidae). *J. New York Entomol. Soc.* 97:1-10.
14. Wagner, D. L., D. R. Tobi, B. L. Parker, W. E. Wallner and J. Leonard. 1989. The immature stages and natural enemies of *Korscheltellus gracilis* (Lepidoptera: Hepialidae). *Ann. Entomol. Soc. Amer.* 82: 717-724.
15. Wagner, D. L. 1989. Rearing hepialid moths. *Pan-Pac. Entomol.* 65: 391-396.
16. DeBenedictis, J. A., D. L. Wagner, and J. B. Whitfield. 1990. Larval hosts of Microlepidoptera of the San Bruno Mountains, California. *Atala* 16: 14-35.
17. Wagner, D. L., D. R. Tobi, B. L. Parker, and W. E. Wallner. 1991. *Korscheltellus gracilis* (Grote): A pest of red spruce and balsam fir roots (Lepidoptera: Hepialidae). *Can. Entomol.* 123: 255-263.
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20. Wallner, W. E., D. L. Wagner, B. L. Parker, and D. R. Tobi. 1991. Bioecology of the conifer swift moth, *Korscheltellus gracilis*, tree decline and acidic deposition relationships. pp. 199-204. *In* Forest Insect Guilds: Patterns of Interaction with Host Trees, Baranchikov et al. (eds.). Abakan, USSR, August 13-17, 1989. General Technical Report NE-153.
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27. Landry, J. F. and D. L. Wagner. 1995. Taxonomic review of apple-feeding species of *Phyllonorycter* (Lepidoptera, Gracillariidae) in North America. *Proc. Entomol. Soc. Wash.* 97: 603-625.
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35. Wagner, D. L. and M. C. Thomas. 1999. The odonate fauna of Connecticut. *Bull. Amer. Odonatology.* 5:59-85.
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39. Hohn, F. M., and D. L. Wagner. 2000. Larval substrates of herminiine noctuids (Lepidoptera), macrodecomposers of leaf litter. *Environ. Entomol.* 29: 207-212.
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45. Wagner, D. L., M. W. Nelson, and D.F. Schweitzer 2003. Shrubland Lepidoptera of southern New England and southeastern New York: ecology, conservation, and management. *J. For. Ecol. Manag.* 185: 95-112.
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47. Wagner, D. L., D. Adamski, and R. L. Brown. 2004. A new species of *Mompha* (Lepidoptera: Coleophoridae: Momphinae) from buttonbush (*Cephalanthus occidentalis* L.) with descriptions of the early stages. *Proc. Entomol. Soc. Wash.* 106: 1-18.
48. Davis, D. R. and D. L. Wagner. 2005. Biology and systematics of the neotropical leaf-mining genus *Eucosmophora* (Lepidoptera: Gracillariidae). *Tropical Lepidoptera* 13: 1-40.
49. Wagner, D. L., E. W. Hossler, and F. E. Hossler. 2006. Not a tiger but a dagger: The larva of *Comachara cadburyi* and reassignment of the genus to the Acronictinae (Lepidoptera: Noctuidae). *Ann. Entomol. Soc. Amer.* 99: 638–647.
50. Rota, J. R, and D. L. Wagner. 2006. Predator mimicry: metalmark moths mimic their jumping spider predators. *PLoS ONE* 1(1): e45. doi:10.1371/journal.pone.0000045.
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52. Wagner, D.L. 2007. Barking up a new tree: Ancient pupation behavior suggests *Cerma* Hübner is an acronictine noctuid (Lepidoptera). *Syst. Entomol.* 32: 407-419
53. Wagner, D. L. and L. F. Gall. 2007. History of Butterfly Study in Connecticut. pp. 12-22. *In* J.E. O'Donnell, L. F. Gall, and D. L. Wagner (eds.), Connecticut Butterfly Atlas. Connecticut Department of Environmental.
54. Wagner, D. L. 2007. Butterfly conservation. pp. 289-309. *In* J.E. O'Donnell, L. F. Gall, and D. L. Wagner (eds.), Connecticut Butterfly Atlas. Connecticut Department of Environmental Protection, Hartford, CT.
55. Wagner, D. L. and L. F. Gall. 2007. Studying butterflies. pp. 310-318. *In* J.E. O'Donnell, L. F. Gall, and D. L. Wagner (eds.), Connecticut Butterfly Atlas. Connecticut Department of Environmental Protection, Hartford, CT.
56. Dyer, L.A., M. S. Singer, J. T. Lill, J. O. Stireman III, G. L. Gentry, R. J. Marquis, R. E. Ricklefs, H. F. Greeney, D. L. Wagner, H. C. Morais, I. R. Diniz, T. A. Kursar, and P. D. Coley. 2007. Host specificity of Lepidoptera in tropical and temperate forests. *Nature* 448: 696-699.
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58. Wagner, D. L., J. R. Rota, and T. L. McCabe. 2008. Larva of *Abablemma* Nye (Lepidoptera: Noctuidae: Hypenodinae) with notes on lichenivory and algivory in Macrolepidoptera. *Ann. Entomol. Soc. Amer.* 101: 40-52.

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60. Rota, J. and D. L. Wagner. 2008. Wormholes, sensory nets and hypertrophied tactile setae: the extraordinary defence strategies of *Brenthia* caterpillars. *Animal Behaviour.* 76:1709-1713.
61. Wagner, D. L. 2009. The immature stages: structure, function, behavior, and ecology. Pp. 31-53. *In* W. E. Conner (ed.), *Tiger Moths and Woolly Bears: Behavior, Ecology, and Evolution of the Arctiidae*. Oxford University Press.
62. Nagle, R. B. and Wagner, D. L. 2009. Sample species illustrating diversity within the Arctiidae. Pp. 233-250. *In* W. E. Conner (ed.), *Tiger Moths and Woolly Bears: Behavior, Ecology, and Evolution of the Arctiidae*. Oxford University Press.
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64. Wagner, D. L. 2009. Ode to *Alabama*: The meteoric fall of a once extraordinarily abundant moth. *Amer. Entomol.* 55: 152-155.
65. Wagner, D. L. and R. G. Van Driesche. 2010. Threats posed to rare or endangered insects by invasions of non-native species. *Ann. Rev. Entomol.* 55:547-568.
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6. [Dragonflies and Damselflies of Monteverde, Costa Rica.](#)