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August 23, 2021

VIA EMAIL

Marie-Helene Gratton
15 Soundview
Woodbridge, CT 06032

RE: PRELIMINARY REVIEW

“Proposed Woodbridge North II, 100’ Telecommunication Tower”

at 118 Newton Rd on Prospect Hill; Docket 502 before the CT Siting Council

REMA Job #21-2413-WDB3

Dear Ms. Gratton:

At the request of you and your neighbors, REMA ECOLOGICAL SERVICES (“REMA”) has reviewed the plans and other supporting documentation for an application by CellCo, dba Verizon Cellular, to construct a 100-foot tall telecommunications tower, at the above-referenced location.

REMA has reviewed pertinent documents downloaded from the Connecticut Siting Council (CSC) web site, including, but not limited, to the following:

1. Description of Proposed Cell Site, Woodbridge North 2, 118 Newtown Road, Woodbridge, Connecticut, prepared by Cellco Partnership d/b/a Verizon Wireless; undated.
2. USFWS & NDDC Compliance Determination, by All Points Technology Corp., dated December 5, 2020.
3. Wetland Inspection report, prepared by All Points Technology Corp., dated October 3, 2020.



In the course of our review, we also obtained secondary-source data from various online sources, including, archival aerial photographs, recent aerial photographs (i.e., Google Earth), GIS-based data (e.g., CT ECO), and the USDA-NRCS Web Soil Survey. The subject site was viewed by REMA from its perimeter in July and August of 2021.

1.0 EXECUTIVE SUMMARY

- ❖ The proposed cell tower facility will result in adverse impacts in both the abundance and diversity of breeding and migratory avians (i.e., nesting and foraging), through the reduction of food supply, including due to the effects upon invertebrate food sources.
- ❖ The proposed cell tower facility will result in adverse impacts to the existing wildlife corridor that connects significant off-site habitats.

2.0 INTRODUCTION

The proposed tower will support 12 antennas, 12 remote radio-heads, a propane fuel tank, equipment cabinets, and a generator, and will be constructed on a 100-foot X 100-foot parcel. The application does not include the proposed frequencies of radio-wave emissions. The tower itself will be within a fenced-in 50 ft X 50 ft area, approximately 150 feet north of the property line. The applicant plans to lease the land for the tower from the current property owner, Michael Soufrine, Trustee. The tower site is part of a 6.01 acre property, formerly farmland and more recently the subject of a residential subdivision application, not approved.

In particular, REMA has been asked to evaluate the potential for impacts on ecological integrity and wildlife support function in this neighborhood. Usage of the site vicinity by birds and other wildlife has been carefully documented over the past five years, by adjoining property owner, Timothy Mulherin.

This assessment of potential impacts on wildlife considers both the habitat quality and the level of wildlife usage on the site, and also the potential for adverse impacts from the proposed tower on the local ecosystem, based on the scientific literature. This includes multiple accounts of nocturnal avian impacts with cell towers, and a body of research on effects of radio-frequency (non-ionizing) electromagnetic radiation (RF-EMR) on the reproduction, fertility, and behavior of wildlife and insects.



3.0 EXISTING CONDITIONS

3.1 LANDSCAPE SETTING

The cell-tower site is at the western end of old-field habitat on a flat hilltop within rural-residential northern Woodbridge (see Figures 1 and 2, attached). Wooded residential lots occupy the side slopes of Prospect Ridge, with a swath of mature forest, bordering the Soufrine property to the south. The property is part of an established wildlife corridor, shown on Figure 1 (attached), which extends northeasterly via half-mile long Burnt Swamp to extensive, rugged open space on Round Hill on the west side of Lake Chamberlain, in Bethany. That tract is likely important habitat for the resident black bears, mentioned in Table 2 (attached) (see Photo 9, attached). At the west end of the Soufrine property, homes between the cul-de-sacs are widely spaced, so as to allow wildlife movement southerly into Street Memorial Park and the Wepawaug River. Nearby large ponds and marshland provide breeding habitat for tree frogs, and support wetland birds.

Deep, fertile, moist soil occupies the site of the proposed cell tower, and also the larger vicinity, extending over 150 meters in all directions. Per the USDA-NRCS soils survey mapping, the soil series throughout this area is the well-drained Charlton-Canton series complex. Plant growth is not constrained by hardpan or ledge. The loamy soil is derived from glacial till and has a balanced mix of particle sizes. The deep level to gently sloping soil has a high moisture-holding capacity.

3.2 VEGETATION

The Charlton-Canton soil supports a healthy mature forest, including about seven very large hardwood trees with deep taproots and diameters of 3-4 feet. This forest occurs both on the Soufrine property perimeter (extending about fifty feet back from the property line) and in the abutting residential lots to the south. The forested swath increases in width, proceeding westerly along the property line, which is demarcated by a massive stone wall. This entire forested area will fall within the zone of influence of the low frequency radiation to be emitted, a 14.6-acre circle with an approximately 450 foot radius from the tower. The former farmland on the subject property is now a mosaic of meadow, shrubs, and young trees (many black walnuts and one American sycamore). This habitat will also fall within the zone of influence of the cell tower.



Hardwood forest trees include sugar maples, red maples, many black walnuts and shagbark hickories, and one towering, four-foot diameter cottonwood tree. These are all considered moisture-loving species of mesic forest. The dominant understory shrub along the wall is spicebush, which also grows in wetlands; winterberry is present as well, and Virginia creeper is a dominant groundcover. Common elderberry, a heavy fruiting wetland shrub with high cover value, grows on the southern forest edge.

Also important are trees that thrive in dry forest: several large black oaks, abundant black cherry trees with a heavy fruit crop, a grove of white pines at the east end, and occasional American beech, black birch, pignut hickory, smooth shadbush, and sassafras. A group of pole size invasive Tree of Heaven were also observed on the Soufrine property. Blackberry and shade-stunted, invasive multiflora rose are also common.

3.3 WILDLIFE DATA

The adjacent property owner, at 110 Newton Road, is a serious and dedicated observer of wildlife, especially birds. He spends many hours each week observing and recording the birds who come to his array of feeders and bird baths, and forage and breed on his property, or rest and feed there during migration, noting the frequency of visits and indications of breeding. For several species, there are multiple nesting pairs. He also records the birds that fly overhead enroute to nearby ponds, or to the meadow on the subject property, to the north.

Table 1 (attached) is an annotated list of 59 species (Birds of Prospect Hill, Woodbridge, CT). Many of the species may benefit from the supplemental food, but they also need and use the broad swath of natural, high-quality habitat to the north of the Mulherin house, described in Section 4.0, including habitat on the subject property. Other species like Carolina wren, bluebird, robin, and catbird do not come to the feeders, but are common none-the less, using only natural habitat. Habitat features are listed below. Non-avian vertebrate species are also observed by Timothy Mulherin, and recorded as well (see Table 2, attached).

3.4 WILDLIFE HABITAT

Forested Wildlife Habitat

The swath of maturing forest to the south of the proposed cell tower site, paralleling the property boundary, provides considerable mast from the mature oaks, and the groves of black walnuts and hickories. The trees also have a high volume of foliage for insect gleaning. The



concentration of black cherry trees attracts flocks of fruit-eating birds, like American robins and starlings; fox grapes, elderberry, blackberry, and green briar are also fruit producers. There is also ample bark and branches for bark gleaning, in particular one large dead tree to the north of the Mullherin house, consistent with the diverse and abundant group of resident woodpeckers. Leaf litter on the forest floor is foraging habitat for turkeys seeking acorns. The grove of white pines contributes winter cover. Ample nest sites are available as well.

With its abundant passerine songbirds, the site also supports bird hawks, namely a resident pair of Cooper's hawks and the more secretive broad-winged hawk, a CT Species of Special Concern. Abundant insects in multiple forest niches are the base of the wildlife food chain.

Meadow Habitat

Unshaded meadow vegetation was too far from the property line for plant identification or bee observation, other than the goldenrod taxa, but a variety and abundance of butterflies were noticed from a distance (see Figure 2, attached). It is unclear to what extent the meadow habitat is impaired by invasive mugwort. Table 2 (attached), the list of non-avian vertebrates, includes species like red fox and Eastern cottontail, that rely on old field habitat for food and cover. The meadow is presumed to support rodents eaten by local red-tailed hawks, owls, and red foxes; seeds for the flock wintering white throated sparrows, and flying insects for barn swallows, night hawks (a CT Species of Special Concern), and bats. Mr. Mullherin's observed a very uncommon migrating loggerhead shrike, who had presumably been foraging for insects in the Soufrine field. Habitat value is closely tied to the capacity of meadow and scrub shrub habitat to support diverse and abundant insects.

Ecotones

As can be seen on the perspective aerial photograph (see Figure 2). The cell tower facility is proposed in a transitional area between open field and maturing forest. This type of habitat is often referred to as an ecotone, which is defined a transitional habitat having characteristics of the adjoining habitats (e.g., forest and meadow). Typically, ecotones have a higher biodiversity, are preferred as nesting habitat for many avians. The abundance of good quality ecotone habitat at and in the vicinity of proposed cell tower site is one of the primary reasons for the documented diversity and abundance of avians.



4.0 POTENTIAL ADVERSE IMPACTS

4.1 COLLISION RISKS

Two categories of potential impacts need to be considered by the Connecticut Siting Council. The first, mentioned here, is straightforward, the fact that night-flying migratory birds often collide with communications towers, especially in overcast or foggy conditions, albeit mostly on lighted towers. A recent Fish & Wildlife service fact sheet, states that about 6.6 million birds die annually from this cause, especially when towers are situated on ridges which are closer are to the cloud ceiling than towers in valleys, and which often function as flyways. Common sense guidance was well-phrased in an on-line Guidance Sheet by the New Mexico Department of Game: "*Towers should not be located in known bird concentration areas or areas with a high incidence of low cloud cover or fog...*" Avoidance of areas supporting species of conservation concern is also mentioned. Timothy Mulherin has carefully documented the abundant and diverse assemblage of birds that uses the eastern upper slope of Prospect Ridge, near or at the proposed cell tower site.

4.2 IMPACTS OF RADIOFREQUENCY ELECTROMAGNETIC RADIATION (RF-EMR)

4.2.1 Introduction

A growing body of research is continuing to document subtle adverse effects on many kinds of non-human organisms of this category of radiation, which is emitted in pulses, from cell towers within the frequency range of 10MHz to 300 GHz. A comprehensive, systematic review paper by Cucurachi et al., was published in 2013.¹ Dr. Cucurachi, the lead author of the 2013 Review Paper, is from the Institute of Environmental Science, at the University of Leiden in the Netherlands. Co-authors were from the National Institute for Public Health and the Environment. This review paper summarizes 113 articles, in tabular format, organized by taxonomic group, including both articles that found impacts, and those that did not.

4.2.2 Status of Regulation of RM-EMR Impacts on Humans

At the present time there is no federally-mandated radio frequency (RF) exposure standard, although ionizing, shorter wavelength, radiation is regulated. Less progress has been made in

¹ Cucurachi et. al. 2013. A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF) Environmental International. 51(2013): 116-140.



documenting impacts of RM-EMR exposure on humans, children in particular, than on wildlife. Per the website of the WHO International Project, constraints include the plethora of electromagnetic sources in homes, and ethical constraints on direct experimentation. However, research at the cellular and molecular level continues to raise concerns, in particular because RM-EMR exposure can affects the blood-brain barrier, calcium ion channels (which relate to neuro-endocrine function), and concentrations of free radicals, which cause DNA damage.

4.2.3 Studies of RF-EMR Impacts

Of the fauna groups included in the Cucarachi Review, birds and insects had the highest incidence of significant adverse impacts, whereas studies of mice showed minimal impacts. All plant studies found inhibition of growth and tissue abnormalities, with more severe impacts (foliage browning), near towers, across from antennae. In addition to the comprehensive tables, key studies are discussed in more detail in the Cucarachi review paper. Most of these studies are also described in another excellent review paper by Sivani & Sudersanami (2012), which also includes valuable technical background information.² The latter paper did lead to strengthening of regulations of RF-EMR in India.

Effects on Reproduction

Especially important were the field studies in Spain by Alfonzo Balmori, which demonstrated adverse impacts on wildlife from radiofrequency electro-magnetic radiation (RF-EMR).³ One study correlated low abundance of house sparrows (a passerine species) with measured RF-EMR levels, on a large scale; colonies near cell towers were found to be dwindling. Another study compared the breeding success of stork colonies within approximately 200 meters of cellular towers, with that in control colonies. He documented significant adverse impacts on breeding success, plumage, and behavior. Balmori also demonstrated developmental abnormalities and mortality among amphibian tadpoles (*Rana temporaria*) developing 140 m from four cell towers, compared to adjacent control colonies shielded from radiation by Faraday cages. Besides direct harm to developing embryos or eggs, Dr. Balmori noted that reduced densities of insects, a major food source for birds, may be a factor contributing to

² Sivani, S. and D. Sudarsanam. 2013. Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystme and ecosystem – a review. *Biology and Medicine*, 4 (4): 202-216.

³ Balmori, Alfonso. 2009. Electromagnetic pollution from phone masts. Effects on wildlife. *Pathophysiology* 169(2009): 191-199.



observed distribution patterns (absence from high-RF-EMR areas) may be Avoidance behavior can also result in low wildlife densities near cell towers.

Following is a quote from the conclusion to the bird section of the comprehensive, review paper by Cucurachi et al, from in Section 4.13 on p.122:

“Amongst the more recent laboratory studies evidence of an effect of RM-EMF on mortality and development of embryos was in all cases found at both high and low dosages. ...all the five field studies (including those by Balmori) found a significant effect of RM-EMF on breeding density, reproduction, or species composition. Field observations give a closer representation of real life exposure, thus RM-EMF exposure, especially in the 900 MHz GSM band, could be a certain factor influencing the ecology of birds.”

With regard to honeybees, the Cucurachi report states on p. 123 that:

“Honeybee studies included six that focused on the frequency ranges specific to mobile communication and in all cases found a significant relationship between exposure to the field and the effects studied.”

Of grave concern are the acute responses consistent with colony collapse.

Most of the insect studies also showed adverse impacts from exposure of larvae/gonads to RM-EMF in studies testing radiation in the 900 MHz to 1800 MHz range. All but one fruit fly (*Drosophila*) study found significant adverse effects on development, including mortality. This is consistent with other researchers' findings of impacts to avian and amphibian embryonic development.

Effects on Orientation & Behavior

A currently active research topic is the mechanisms by which birds and insect orient themselves and navigate, by detecting the earth's magnetic field; the mechanism involves ferromagnetic particles embedded in tissue and pairs of molecules with unpaired electrons. Natural electromagnetic orientation is vulnerable to disruption by low frequency, low energy RF-EMS emissions, as both insect and bird studies have showed. The Cucurachi review



focused on a cockroach study by Vacha et al (2009)⁴. Important work has also been done on RF-EMS effects on orientation by European robins ⁵.

The insect section of the 2013 Cucurachi Review also included laboratory research on interference by RF-EMF emissions with other types of insect behaviors crucial for survival, such as foraging, namely eliminating an ant species' ability to remember food characteristics and locations (Cammaerts et al., 2012)⁶. Study results are consistent with anecdotal accounts reported by Balmori of a conspicuous lack of insects and spiders in houses close to cell towers in South Africa.

4.3 REGULATORY CONSIDERATIONS

Most studies of the studies in the Cucurachi review paper evaluated the effects of the frequencies emitted by cell towers, 900 MHz to 1800 MHz, or even lower frequencies. The studies of exposure to RM-EMR frequencies greater than 2000 MHz showed very few significant adverse effects. Energy level of the magnetic field decreases with distance from the tower, but unfortunately, significant effects were detected even for low intensity and low frequency magnetic fields. This means that risks to wildlife, insects, and vegetation are present, even on the outer perimeter of the zone surrounding a cell tower, 150 or 200 meters from the tower. None of the studies showed any correlation between intensity of impact and intensity of the radiation.

The zone of influence includes the forested swath and the homes to the east of the subject property, including that of Mr. Mulherin. This situation (lack of correlation with intensity of exposure) is contrary to that for most environmentally harmful agents, and presents major challenges from a regulatory perspective – impact thresholds are unclear. However, the old thermal thresholds are clearly obsolete.

On February 7, 2014 shortly after publication of the Cucurachi and Sivani & Sudarsan review papers on the manifold impacts of RM-EMR, a strongly worded communication from Willie Taylor, Director, Office of Environmental Policy and Compliance of the Department of the

⁴ Vacha, M, Puzov, T, & Kvicolova. Radiofrequency magnetic fields disrupt magnetoreception in American cockroach. *J. Exp. Biology* (2009) 212 (Pt. 21): 3473-7.

⁵ Thalous, R., Ritx, T., Stapput, K., Wiltschko R, Wiltschko W. Magnetic compass orientation of migratory birds in the presence of a 1.315 MHz oscillating field. *Naturwissenschaften*. 2005;92:86-90.

⁶ Cammaerts, M.C. et al. 2012. GSM 900 Mhz radiation inhibits ants' association between food sites and encountered cues. *Electromagnetic Biol. Med.* 2012; 31 (2): 151-165.



Interior was sent to the FCC (Federal Communication Commission) with regard to badly outmoded procedures for placement and operation of communications towers. He urged procedures that better protect migratory birds, especially those with protected status. He urged consideration of risks from low frequency radiation, based on the recent science, as well as measures to minimize collisions. Dr. Albert Manville, of the U.S. Fish & Wildlife Service (USFW), had taken the lead in encouraging reform to protect natural ecosystems from this source of harm.

5.0 CONCLUSION

Reforms in federal standards have not yet materialized. However, at the state level, the CT Siting Council can make siting decisions, based on the current body of science, that will protect a valuable natural ecosystems from the expected harm that unavoidably accompanies a cell tower.

As outlined the above analysis, and based on the current scientific literature, it is our professional opinion that adverse impacts to the ecology of the cell tower site would result from the proposal:

- ❖ The proposed cell tower facility will result in adverse impacts in both the abundance and diversity of breeding and migratory avians (i.e., nesting and foraging), through direct exposure to radio frequency – electromagnetic radiation (RF-EMR), the reduction of food supply, including due to the effects upon invertebrate food sources.
- ❖ The proposed cell tower facility will result in adverse impacts to the existing wildlife corridor that connects significant off-site habitats.

We urge you not to approve the proposed cell tower because the potential for harm is magnified by the site's unique ecological setting. The zone of influence for the proposed tower encompasses productive, lush forested and meadow habitats, including transitional habitats (i.e., ecotones) populated with exceptionally abundant and diverse bird life, as all the expected wildlife species, as documented by Timothy Mulherin.

The proposed cell tower site happens to be situated along an established landscape corridor with good linkage, such that other habitats, such as Burnt Swamp and Round Hill are accessible. In particular, the expected significant depletion of insect populations and the



reduced growth of vegetation will render the habitat unsuitable for the currently resident suite of birds and animals.

Respectfully submitted,

REMA ECOLOGICAL SERVICES, LLC

George T. Logan, MS, PWS, CSE
Professional Wetland Scientist
Certified Senior Ecologist
Wildlife Biologist

Sigrun N. Gadwa, MS, PWS
Professional Wetland Scientist
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List of Attachments: Figure 1: Landscape Setting; Figure 2: Perspective Aerial Photograph; Table 1: Birds of Prospect Hill, Woodbridge, CT; Table 2: List of Mammals, Snakes, Amphibians, Prospect Hill, Woodbridge;

FIGURE 1. Landscape setting showing wildlife corridor connecting the larger open space areas. Prey density is higher, disturbance is less, and usage by birds and probability of adverse impacts is greater along a wildlife corridor than in intervening \developed areas.



FIGURE 2: PROPOSED CELL SITE

118 Newton Road, Woodbridge, CT

[as seen on a "Bird's Eye" perspective aerial;
Bing.com; (c) 2021] (easterly view)



TABLE 1: Birds of Prospect Hill, Woodbridge, Connecticut

<u>Common Name</u>	<u>Scientific Name</u>	<u>Comments</u>
Canada Goose	<i>Branta canadensis</i>	Regular Flyover, sometimes large flock
Great Blue Heron	<i>Ardea herodias</i>	Flyover, to and from nearby ponds, river
American Woodcock	<i>Scolopx minor</i>	sitting in driveway in spring 2020
Wild Turkey	<i>Meleagris gallopavo</i>	BR Multiple ages, successful breeding
Cooper's Hawk	<i>Accipiter cooperii</i>	BR, Abundant
Sharp-shinned Hawk	<i>Accipiter striatus</i>	CT Endangered
Red Tailed Hawk	<i>Buteo jamaicensis</i>	BR , daily visitors, soaring perching
Broad-winged Hawk	<i>Buteo platypterus</i>	Scarce, CT Species of Special concern
Red-shouldered Hawk	<i>Buteo lineatus</i>	
Merlin	<i>Falco columbarius</i>	Hunting technique helped confirm ID
Osprey	<i>Pandion haliaetus</i>	Flyover
Black Vulture	<i>Coragyps atratus</i>	BR 2019-21 first observed in 4/2017
Turkey Vulture	<i>Cathartes aura</i>	Observed soaring almost daily
Barred Owl	<i>Strix varia</i>	BR m/f calling to each other
Great Horned Owl	<i>Bubo virginianus</i>	Heard in 2016 to 2020, not 2021
Mourning Dove	F <i>Zenaida macroura</i>	About six are resident

Birds of Prospect Hill, Woodbridge, CT (cont.)

Common Nighthawk		<i>Chordeiles minor</i>	
Ruby-throated Hummingbird	F	<i>Archilochus colubris</i>	BR migratory and 1 breeding pair
Barn Swallow		<i>Hirundo rustica</i>	Abundant (presumed breeding)
Tree Swallow		<i>Tachycineta bicolor</i>	Scarce
Northern Flicker		<i>Colaptes auratus</i>	Abundant at this site, <i>In decline in CT</i>
Hairy Woodpecker	F	<i>Picoides villosus</i>	frequent visitors, forage in big dead tree
Downy Woodpecker	F	<i>Picoides pubescens</i>	Abundant BR , m/f forage in dead tree
Red Bellied Woodpecker	F	<i>Melanerpes carolinus</i>	BR , m/juveniles, forage in big dead tree
Pileated Woodpecker		<i>Dryocopus pileatus</i>	BR , juv., forage in big dead tree, weekly
Yellow-bellied sap sucker		<i>Sphyrapicus varius</i>	only in 2021, foraging male
Eastern King Bird		<i>Tyrannus tyrannus</i>	Scarce , sightings 1-2 X/yr.
Eastern Wood-Pewee		<i>Contopus virens</i>	Scarce
Common Crow		<i>Corvus brachyrhynchos</i>	Daily, mob the raptors
Common Raven		<i>Corvus corax</i>	Observed regularly, 2016-21
Blue Jay	F	<i>Cyanocitta cristata</i>	Abundant, BR , fledgling photos
Black-capped Chickadee	F	<i>Poicile atricapillus</i>	Abundant, BR
White-breasted Nuthatch	F	<i>Sitta carolinensis</i>	BR , daily
Tufted Titmouse	F	<i>Baeolophus bicolor</i>	BR collecting nesting material

Birds of Prospect Hill, Woodbridge, CT (cont.)

Carolina Wren	F <i>Thryothorus ludovicianus</i>	Abundant, BR – Nest construction
House Wren	<i>Troglodytes aedon</i>	
Grey Catbird	<i>Dumetella carolinensis</i>	BR – 2 nests; feed each other, bird bath
Northern Mockingbird	<i>Mimus polyglottos</i>	From 2019 to 2021
Eastern Bluebirds	<i>Sialia sialis</i>	Huge flock-winter 2017, bird bath, yearly
American Robin	<i>Turdus migratorius</i>	Occ. winter flocks, N.wooded swath
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Uses open field habitat
Black and White Warbler	<i>Mniotilla varia</i>	female, treetops west side
American Redstart	<i>Setophaga ruticilla</i>	migrating male
Red winged Blackbird	F <i>Agelaius phoeniceus</i>	m/f, come from ponds to E. & S.
Brown-headed Cowbird	F <i>Molothrus ater</i>	1-2 , m/f BR probable
Common Grackles	F <i>Quiscalis quiscula</i>	Use large pond to SE
Starling	F <i>Sturnus vulgaris</i>	BR , 4 nests, m/f
House Sparrow	F <i>Passer domesticus</i>	BR , abundant, m/f, 15-20
Dark-eyed Junco	F <i>Junco hyemalis</i>	winter residents
Northern Cardinal	F <i>Cardinalis cardinalis</i> m/f	BR , m/f, 3 nesting pairs, feed each other
House Finch	F <i>Carpodacus mexicanus</i>	BR , m/f, fledglings; 10-20, winter res.
Purple Finches	F <i>Cardopacus purpureus</i>	BR , m/f, fledglings present, 10-20

Birds of Prospect Hill, Woodbridge, CT (cont.)

Evening Grosbeak	F	<i>Coccothraustes vespertinus</i>	m/f, During migration
American Goldfinch	F	<i>Carduelis tristis</i>	BR, Abundant , m/f
Rose-breasted Grosbeak	F	<i>Pheucticus ludovicianus</i>	BR m/f feed each other 1 st : May 2017
Indigo bunting		<i>Passerina cyanea</i>	Uses open, field habitat
Eastern Towhee	F	<i>Pipilo erythrrophthalmus</i>	Scarce , BR f/m, uses fields/ shrubland
Song Sparrow		<i>Melospiza melodia</i>	Abundant . Uses open, field habitat
White-throated Sparrow	F	<i>Zonotrichia albicollis</i>	Abundant . Large winter flocks, >15
Chipping Sparrow		<i>Spizella passerina</i>	Scarce

TOTAL: 59 species

All birds were observed by Timothy Mulherin on or from the Mulherin Property at 110 Newton Rd, Woodbridge, Connecticut. This property is Certified Wildlife Habitat, by the National Wildlife Federation.

Mr. Mulherin is a member of the Cornell University Lab of Ornithology, a regular data-contributor.

By: Timothy Mulherin. Identifications were by sight, not sound, so cryptic forest birds are missing from list.

This property abuts the proposed cell tower site, to the west. Observation period: 2016 to July, 2021.

BR = Evidence of Breeding, for 24 species. Others may also be breeding, but no clear-cut indicators were observed, such as fledglings, nest, feeding behavior, male & female together in breeding season

F = Observed at feeder array, which includes multiple feeders for black oil sunflower seeds, thistle seed feeders, and a bird bath, heated in winter.

Table 2. Mammals/ Snakes/ Amphibians of Prospect Hill, Woodbridge

2016 -2021

Copyright Timothy Mulherin

A	Gray Squirrel	Breeding
A	Black Bear	Breeding
A	Bobcat	Breeding
A	Raccoon	Breeding
A	Coyote	Seen once, hear regularly
S	Weasel or another mustelid	
A	Red Squirrel	Breeding
A	Chipmunk	Breeding
A	Garter snake	Breeding
S	Milk snake	Breeding
A	Opossum	Breeding
A	Skunk	Breeding
A	Red Fox	Use old field habitat
A	American Toad	
A	Gray Tree frog	
S	Fisher	Heard only
A	White tail deer	Breeding
A	E. Cottontail Rabbit	Breeding
A	Bats	(Species not identified)

19 Species

KEY: A = Abundant; S = scarce

**Annotated Photos: Review of Proposed Cell Tower, 118 Newton Road
Woodbridge CT, CT Siting Council, Docket 502**



Photo 1: Southwesterly view of cell tower site vicinity, showing both forested cover type along boundary wall & the old field cover type in background. By SN Gadwa. 8-11-21.



Photo 2: Southwesterly view of mixed age forested habitat south of the Mullherin bird feeder array. Photo by T. Mulherin.

Annotated Photos: Review of Proposed Cell Tower, 118 Newton Road
Woodbridge CT, CT Siting Council, Docket 502



Photo 3: Photo of dense herb stratum along property boundary showing native Virginia jumpseed, and Virginia creeper, with five leaflets. 8-11-21.



*Photo 4: *Eumorpha pandorus*, a sphinx moth larva, which feeds on the Virginia Creeper (*Parthenocissus quinquefolia*) shown above. Photographed near site by T. Mulherin.*

Annotated Photos: Review of Proposed Cell Tower, 118 Newton Road
Woodbridge CT, CT Siting Council, Docket 502



Photo 5: Photo of woodcock next to moist fertile forest with deep Charlton/ Canton soil suitable for woodcock foraging, probing for earthworms with long bill. T. Mulherin 2020.



Photo 6: Pileated woodpecker visiting large dead tree on 5-15-2020. By T. Mulherin.



Photo 7: Photo of nesting black vultures, an adult with a half-grown chick. Taken on 8-20-20 by T. Mulherin.



Photo 8. Mourning doves are plentiful year-round. They use edge and field habitats where seeds are plentiful. By T. Mulherin.



Photo 9: Black bear in early spring, after emerging from hibernation.
By T. Mulherin, March 28, 2019.



Photo 10: Bobcat photographed on February 21, 2020 by T. Mulherin. Bobcat and black bear traverse this site relatively often. It functions as a wildlife corridor linking multiple suitable habitats for large, wide-ranging mammals.

PROFESSIONAL RESUME

George T. Logan, MS, PWS, CSE

Principal Environmental Scientist/Senior Ecologist

EDUCATION:

M.S. Natural Resources, *Wildlife Management & Conservation Biology*,
University of Rhode Island, Kingston, R.I., 1998

B.S. Natural Resources, *Wildlife Management & Wetlands Ecology*,
University of Rhode Island, Kingston, R.I., 1995

Continuing Education

The Transportation Project Development Process Training in the
PennDOT Environmental Impact Statement Handbook, Harrisburg,
PA, January 1999

Rapid Bioassessment Protocols of Aquatic Systems EPA Protocols,
Wetland Training Institute, Williamsport, PA, August 1999, 1999

CERTIFICATIONS:

(current)

Certified Senior Ecologist (2005, 2014) - Ecological Society of America

Certified Professional Wetland Scientist No. 0010 (1994) - Society of
Wetland Scientists

Registered Soil Scientist (1989) - Society of Soil Scientists of Southern
New England

Certified Associate Wildlife Biologist (1989) - The Wildlife Society

EXPERIENCE:

Mr. Logan is the Co-Owner and *Principal Environmental Scientist* and *Senior Ecologist* for ReMa Ecological Services, LLC. He specializes in tidal and inland wetland delineations and evaluation, permitting, wetland mitigation design, implementation and monitoring, and the preparation of environmental compliance documents in accordance with national NEPA, state (e.g., CEPA, MEPA), and local criteria and guidelines. He also provides design, construction supervision and implementation for a wide variety of habitat restoration and enhancement projects. Mr. Logan performs watershed-wide and surface water quality evaluations and provides guidance in the design of stormwater Best Management Practices (BMPs), including stormwater wetlands and bioretention basins, as well as for LID low impact development practices.

Mr. Logan has nearly 20 years of experience as a wildlife biologist/ecologist conducting wildlife habitat evaluations and focused avian, faunal, invertebrate, and herpetofaunal surveys using both active and passive methods. He frequently conducts targeted surveys for sensitive, rare, and listed species (i.e., endangered, threatened, special concern), and aquatic biosurveys to assess the biodiversity and biotic health of ponds, lakes, vernal pools, rivers, and streams. Mr. Logan has extensive experience in performing herpetological surveys, including over 100 vernal pool investigations and evaluations.

Mr. Logan has participated in nearly 100 individual projects in New England and the Mid-Atlantic States and in 10 of 10 municipalities in Connecticut.



ECOLOGICAL SERVICES, LLC, 164 EAST CENTER STREET, SUITE 8, MANCHESTER, CT 06040 • 860.649.7362

Professional Resume: (continued)

George T. Logan, MS, PWS, CSE

PROFESSIONAL AFFILIATIONS:

Society of Soil Scientists of Southern New England
Society of Wetland Scientists
Association of Massachusetts Wetland Scientists
Ecological Society of America
The American Birding Association
The Wildlife Society
Soil & Water Conservation Society
Connecticut Association of Wetland Scientists (CAWS) (Past-President, Charter member)

PUBLICATIONS: (selected)

Logan, G.T. & S.N. Gadwa. 1999. Quinnipiac River Watershed Association Stream Study. Water Quality in the Quinnipiac River. Proceedings of a Symposium on the Impact of Nonpoint Source Pollution in the Quinnipiac River Watershed, pp. 1-11.

Logan, G.T. & S.N. Gadwa. 1999. Stream Biosurveys: A Primer. Quinnipiac River Watershed Association Educational Series for the Adopt-the-River Programs.

Pawla, E.M. & G.T. Logan. 1999. Town of Cromwell Wetland Evaluation Project. Connecticut Association of Conservation and Inland Wetlands Commissions. The Habitat, vol. 1(1)

Logan, G.T., F.B. Titlow & D.G. Schall. 1999. The Scientific Basis for Protecting Buffer Zones. Proceedings of the 10th Annual Meeting of the Society of Wetland Scientists.

Pawla, E.M. & G.T. Logan. 1999. Town of Cromwell Wetland Buffer Zone Designation Methodology. Proceedings of the 10th Annual Meeting of the Society of Wetland Scientists.

Logan, G.T., H. Brown, T.P. Husband & M.C. Nicholson. 1999. Conservation Biology of the Cretan Agriki (*Capra aegagrus cretensis*). Biologia Gallo-Hellenica, vol. 1, pp. 1-11.

Nicholson, M.C., T.P. Husband, H. Brown, T.P. and G.T. Logan. 1999. Implications of behavior on the Management of the Cretan Agriki (*Capra aegagrus cretensis*). Biologia Gallo-Hellenica, vol. 1, pp. 1-11.

WORKSHOPS & CONFERENCES: (selected)

Internal Pools: *The Jewels of the Forest*. Technical Workshop for the Town of Southwick Conservation Commission. January 2000. (Guest Lecturer)

Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. Corps Training Workshop. May 2001. (sponsor, participant)

Professional Resume: (continued)

George T. Logan, MS, PWS, CSE

WORKSHOPS & CONFERENCES: (selected)

The Importance of Habitat Edges. Riverside Landscaping Conference. The Rivers Alliance of Connecticut. June 1⁰⁰⁰ (Guest Lecturer)

Riparian Buffer Function, Performance & Limitations. Urban Riparian Buffers Conference & Technical Training Session. April 1⁰⁰⁰ (Guest Lecturer)

Sedimentation and Erosion Control Review Session. USDA. Natural Resource Conservation Service and CPESC Certified Professionals in Erosion Control, Concord, NH. September 1⁰⁰⁰.

Buffer Strips as Storage Water Quality Controls. EnviroExpo, Boston. May 1⁰⁰⁰ (Guest Speaker)

Identifying Wetland Soils, Fauna and Flora. Municipal Inland Wetland Staff Technical Workshops. June 1⁰⁰⁰ (Guest Speaker)

Water Quality in the Quinnipiac River: A Symposium on the Impact of Non Point Source Pollution in the Quinnipiac River Watershed. November 1⁰⁰⁰ (Presenter)

Our Hidden Wetlands: Terrestrial Pools in Connecticut. Co-sponsored by CT DEP and the Center for Coastal and Watershed Systems. November 1⁰⁰⁰ and January 1⁰⁰⁰ (Workshop Leader)

Aquatic Invertebrate & Stream Ecology Workshop. Quinnipiac River Watershed Association Workshop Series. September 1⁰⁰⁰, May 1⁰⁰⁰, June 1⁰⁰⁰, January 1⁰⁰⁰ (Workshop Leader)

The Massachusetts Association of Conservation Commissions Third Annual Conference: Wetland Buffer Zones, March 1⁰⁰⁰ (Guest Lecturer)

1st Annual Conference of the Society of Wetland Scientists: Wetland Understanding, Wetland Education, May 1⁰⁰⁰ (Presenter)

Quinnipiac River Watershed Association Forum on Non Point Pollution & Significance of Wetlands and Wetland Buffers, October 1⁰⁰⁰ (Guest Lecturer)

The Massachusetts Association of Conservation Commissions Second Annual Conference, April 1⁰⁰⁰ (Guest Lecturer)

The Society of Soil Scientists of Southern New England Riparian Buffer Zone Conference, November 1⁰⁰⁰ (Presenter)

Professional Resume: (continued)

George T. Logan, MS, PWS, CSE

SUPPLEMENTARY INFORMATION:

1996 to present

Rema Ecological Services, LLC
Principal Environmental Scientist/Ecologist, Co-Owner

- Founded the company to provide natural resources management, environmental planning, compliance and permitting services, and client advocacy throughout the Northeast.
- Has participated in nearly 100 individual projects since the company's inception, including single gas-fired, combined-cycle power plant projects, utility-scale solar projects, over 20 bridge projects, numerous municipal projects, including over 20 new schools, several higher education projects, numerous wetland replacement projects, several new golf courses, and many large residential, industrial and commercial endeavors.
- Was the Interim Environmental Planner for the Town of Waterford, Connecticut, during a ten-month tenure. Responsibilities included providing procedural and technical support to the town's Conservation Commission &a;a. Inland Wetlands and Watercourses Agency, and working closely with Planning Department staff.

1994 to 1996

Fugro East, Inc. (Currently AECOM)

Senior Project Manager/Environmental Scientist

- Office Manager for the firm's Connecticut office, responsible for day-to-day operations, marketing, and business development.
- Wetland delineations in accordance with state and federal criteria.
- Natural resource inventories of upland, wetland and aquatic ecosystems, specializing in wildlife habitat assessments.
- Preparation of environmental compliance documentation for over 100 projects including large-scale commercial development.

1993 to 1994

A.D. Marble & Company, Inc.

Senior Environmental Planner/Wildlife Biologist

- Participated in the management of major transportation improveinent projects and in the preparation of environmental documents in accordance with the National Environmental Policy Act (NEPA) while continuing involvement in the collection of baseline field data.
- Application of the Pennsylvania Department of Environmental Resources (PADER) hierarchical methodology for the selection of suitable wetland replacement sites.
- Field verification of Threatened, Endangered or Special Concern species listed by the Pennsylvania Game Commission.
- Wetland boundary identification in accordance with the unified PADER and U.S. Army Corps of Engineers (USACOE) methodology.
- Participated in nearly 20 projects, mostly for major transportation corridors, such as the rehabilitation of the I-95 corridor in PA.

Professional Resume: (continued)

George T. Logan, MS, PWS, CSE

SUPPLEMENTARY INFORMATION (continued):

1989 to 1993

Soil Science & Environmental Services, Inc.

Wildlife Biologist-Ecologist & Soil Scientist

- Project Manager responsible for field operations and report preparation for nearly 100 individual projects in over 10 towns in New England, including one town-wide wetland mapping, inventory and evaluation project (Town of Cromwell)
- Wetland boundary delineation according to state and federal criteria (e.g., Connecticut and Massachusetts Statutes, U.S. Army Corps of Engineers methodologies)
- Ecosystem analyses and biological inventories of upland areas, tidal and inland wetlands, estuaries, streams, rivers, ponds and lakes.
- Environmental impact evaluations, including site plan review, analyses of proposed impacts and design of mitigation strategies.
- Local, state and federal permitting for impacts to natural resources, including wetlands.
- Implementation of water quality monitoring programs for streams and rivers.
- Design, construction supervision, and monitoring of wetland enhancement, restoration and creation.
- Aquatic surveys of streams and rivers utilizing standardized methods (e.g., EPA Rapid Bioassessment Protocols)
- Detailed faunal surveys and censuses using both active and passive methods (e.g. direct and indirect observation, live trapping, point count avian censuses, pellet counts, etc.)
- Expert witness testimony for court and administrative proceedings.

1988 to 1989

Independent Contracts

Soil & Wetland Scientist

- Summer of 1988 Was hired by the Town of Canton, CT to identify, inventory, and evaluate wetlands and watercourses within the entire municipality. Was responsible for developing the municipality's *Official Wetland and Watercourses Map*.
- Spring of 1988 Was hired by the Connecticut Chapter of the Nature Conservancy to determine and report on the historic expansion of invasive plants (*Phragmites australis*, *Lythrum salicaria*) on eight TWC preserves. Scope included site visits, remote sensing using archived aerial photographs, and report.

TECHNICAL REPORTS:

Mr. Logan has completed several hundred comprehensive studies (e.g., Wetlands Assessments, Ecological Evaluations, Environmental Impact Analyses/Statements, Internal Pool Investigations, Listed Species Surveys/Management Plans, Aquatic Vegetation Surveys), and a variety of other specialized studies. A representative list, or examples of these technical reports can be provided upon request.

CARYA ECOLOGICAL SERVICES, LLC, 183 GUINEVERE RIDGE, CHESHIRE, CONNECTICUT, 06410
& 164 EAST CENTER STREET, SUITE 9, MANCHESTER, CT 06040 • 203 537.1869
SIGRUN.N.GADWA@GMAIL.COM WWW.CARYAECOLOGICAL.COM

Curriculum vitae

Sigrun N. Gadwa, MS, PWS
Ecologist/Botanist/Wetland Scientist

EDUCATION: M.S., Plant Ecology, University of Connecticut, Storrs, CT, 1997.

B.A., Biology, Brown University, Providence, R.I., 1975.

Continuing Education

16 credit hours in Soil Science and Geology, 1993 – 2001

University of Connecticut, Storrs

Graduate course in Phycology, Pan American University, Brownsville, Texas, 1982

Arboriculture course, Quinnipiac College, Hamden, CT, 1984

Five Plant Pathology courses, Cook College, Rutgers University, New Brunswick, N. J. 1978 - 1979

CT DEEP training workshop Series: Rapid Bioassessment

Techniques, & Stream Ecology Workshops. Bethany.1996 & 7.

Riparian Buffer Function, Performance & Limitations. Urban Riparian Buffers Conference & Technical Training Session. April 1999.

Freshwater Mussel Workshop. New Hampshire Department of Environmental Conservation. August 2004.

Sedimentation and Erosion Control Review Session. USDA Natural Resource Conservation Service and CPESC (Certified Professionals in Erosion Control), Concord, NH, September, 2001.

Moss Identification & Ecology,1-week course; Eagle Hill Institute. 6-19.

CERTIFICATIONS:

Registered Soil Scientist,

Society of Soil Scientists of Southern New England

Certified Professional Wetland Scientist

Society of Wetland Scientists

Organic Land Care Professional. NOFA (Northeast Organic Farming Association)

EXPERIENCE:

As a plant ecologist Ms. Gadwa inventories, assesses, photographs, and monitors ecological communities, often in support of open space acquisition initiatives. She plans & guides control programs for invasive plants, and searches for listed plant and turtle populations and assesses their habitat. Botanical specialties include vascular plant identification and winter botany. As a wetland and soil scientist, she assesses functions & values, delineates wetland and watercourse jurisdictional boundaries (CT and U.S. Army Corps of Engineers), plans & supervises wetland mitigation and restoration. She performs vernal pool studies, water quality testing and data analysis, and in-stream bio-assessments. Her effective third-party reviews of development projects draw on this expertise.

Curriculum vitae: *(continued)*

Sigrun N. Gadwa, MS, PWS
Ecologist/Botanist/Wetland Scientist

EMPLOYMENT HISTORY:

1999 to present **Carya Ecological Services, LLC, Principal, subcontractor to Rema Ecological Services, LLC**, Manchester, CT, an environmental science collaborative; Ecological fieldwork, planning, and reporting.

2013 to 2018 **K & W Construction**, Southbury, CT, *subcontractor*
Erosion & Sediment Control Inspections, Turbidity testing for CT DEEP

2014 to 2019 **South Central CT Regional Water Authority**, New Haven, CT
Responsible for long term vegetation monitoring each fall, and reporting for compliance with CT DEEP Wellfield Diversion Permit.

2015 to present **Post University, Waterbury Campus**
Adjunct Professor of Botany & Ecology.

2001 to 2004 **CT DEEP Wildlife Division, subcontractor**
Vegetation and wetland inventories & mapping of large Wildlife Management Areas (WMAs).

2003 to May 2016 **Ships' Hole Farm Partnership**, Smithtown, Long Island, NY
Responsible for vegetation management & invasive control; growing seed and nursery stock of native species on family farm.

1995 to 2000 **Quinnipiac River Watershed Association Meriden, CT**
Executive Director/Staff Scientist
Led botany hikes and a volunteer monitoring program, including stream bio-assessments, turbidity testing, and bird/wildlife surveys; site plan reviews of projects impacting the watershed; wrote testimony, grants, publicity, and educational materials; liaison with officials. Chair of Habitat Work Group of the **Watershed Partnership**, which identified and documented Quinnipiac watershed habitats in need of protection or restoration until 2003. Continue as advisor/coordinator for turtle monitoring program.

1991 to 1995 **De Leuw-Cather, Inc.**, East Hartford, CT
Environmental Planner/Field Ecologist
Field data collection, analysis, and report preparation, primarily for large highway projects; specialties included listed plant searches, wetland functional assessments, mitigation design, vegetation monitoring, & wetland delineation (ACOE method).

Curriculum vitae: *(continued)*

Sigrun N. Gadwa, MS, PWS
Ecologist/Botanist/Wetland Scientist

EMPLOYMENT HISTORY: *(continued)*

1987 to 1991	Univ. of Connecticut Department of Civil Engineering , Storrs, CT <u>Wetlands Researcher</u> Part of an interdisciplinary team, studying man-made replication wetlands and natural reference wetlands. Took part in research design; collected vegetation, soils, & hydrologic data; literature searches; data analysis. Research used for wetlands mitigation-related manual for the Connecticut Department of Transportation and for master's thesis.
1974 to 1975	Brown University , Providence, RI <u>Teaching Assistant, Plant Systematics</u>
1968 to 1975	Long Island Nature Conservancy, Stewardship Volunteer Nature trail development & maintenance, botanical inventories, wrote preserve descriptions & self-guided nature trail brochures.

Carya E.S. clients have included Berlin Land Trust, Avalonia Land Conservancy, Groton Open Space Association, Cardinal Engineering, Joshua's Trust, Wright-Pierce, RACE Coastal Engineering, and Catherine Pratt (landlord of CT River shoreline property)

PROFESSIONAL AFFILIATIONS:

Connecticut Botanical Society (Board of Directors,
Chair, CBS Ecology & Conservation Committee)
Connecticut Invasive Plant Working Group (CIPWG)
Connecticut Association of Wetland Scientists
Society of Soil Scientists of Southern New England
Connecticut Ornithological Society
Ecological Society of America
Native Plant Trust (PCV - Plant Conservation Volunteer Program)

PUBLICATIONS:

Lefor, M.W. Barklay, J.S. Cooke, R.S. Craig, S.N. Gadwa, T.S. Murray, April 1990. *Annotated Bibliography for Wetland Mitigation*.

August 1990. *Patterns of Herb Layer Species Association*. In Lefor, M.W. et al *Wetland Mitigation: Interim Report* No. CT-RD-JHR-90-8, The Transportation Institute, Storrs, Conn. 97 pp.

1994. *Forests*. In Chesanow et al. *Trails*. The Cheshire Land Trust and the Cheshire Environment Commission, Cheshire, CT 96 pp.

Curriculum vitae: (continued)

Sigrun N. Gadwa, MS, PWS
Ecologist/Botanist/Wetland Scientist

PUBLICATIONS, cont. :

May 1995. *Wetland Mitigation: Botany*. Volume 1 of 6. Lefor, M.W. and S.N. Gadwa. Report No. JR95-241. Dept. Civil Engineering, Joint Highway Research Council, Transportation Institute, Storrs, Conn. 259 pp.

December 1997. *Plant Colonization Processes and Patterns along Shorelines of Man-made Mitigation Basins in Relation to Reproductive and Life History Traits*. MS Thesis. Dept. Ecology & Evolutionary Biology. Univ. of Connecticut, Storrs, CT. 181 pp.

River Resources Education Series, Quinnipiac River Watershed Association, Meriden, CT. May 1995 *New Haven Oysters*; June 1996 *What Good are Streamside Woods*; August 1996 *Taking a Close Look at Streamside Woods*; June 1997 *Foraging in the Quinnipiac Estuary*; March 1998 *Stream Biosurveys* (G.T. Logan & S. Gadwa) ; Sept. 2000 *Muddy Waters*.

Logan, G.T. & S.N. Gadwa. *Quinnipiac River Watershed Association Stream Study*. Water Quality in the Quinnipiac River. Proceedings of a Symposium on the Impact of Nonpoint Source Pollution in the Quinnipiac River Watershed, pp. 66-70.

October 2000. *A Report on the Water Quality of the Quinnipiac River*. M. Tyrell, C. Cappannari, D. Galt, S. Gadwa, L. MacMillan, R. Walters. Report to the Steering Committee of the Quinnipiac River Watershed Partnership. Q.R.W.P. Water Quality Workgroup, New Haven, CT. 19 pp.

Winter 2003. *Management of Invasive Plants: On-Site Open Space Management*. The Habitat 15(2):3-4 Connecticut Association of Conservation and Inland Wetland Commissions, Inc.

Spring 2003. *Management of Invasive Plants: Protecting Open Space and Wetlands, Tools for Land Use Boards and Town Staff*. The Habitat 15(3):4-5. Connecticut Association of Conservation and Inland Wetland Commissions, Inc.

July 2003. Interpreting Quinnipiac Songbird Surveys: Effects of Landscape Setting on Avian Community Composition. *The Connecticut Warbler*. 23(3):81-114.

June 2004. *Connecticut Turtles of Special Concern*. Quinnipiac River Watershed Association. 4 page pamphlet. (illustrations by Tony Ianello)

Curriculum vitae: (continued)

Sigrun N. Gadwa, MS, PWS
Ecologist/Botanist/Wetland Scientist

PUBLICATIONS, cont.:

Fall 2005. S. N. Gadwa. *Preliminary Assessment of the Habitat & Historic Resources in North Cheshire, West of Route 10 & Recommended Protection Measures*. Cheshire Land Trust & Habitat Workgroup of Watershed Partnership.

October 2011 S. N. Gadwa & G.T. Logan. *The Scientific Basis for Wetland & Watercourse Buffer Zones*. 23 pp. White Paper. Rema Ecological Services, LLC.

Spring 2014. Sigrun N. Gadwa. *The Invasive Threat to Connecticut's Upland Critical Habitats*. 3pp. Connecticut Botanical Society Newsletter 41: 1.

Spring 2020. Sigrun N. Gadwa. *Gabbro Habitats in Southeastern Connecticut*. Connecticut Botanical Society Newsletter 47: 1.

WORKSHOPS & CONFERENCES

SA Mid-Atlantic Chapter Symposium, Blacksburg Virginia
Lessons for Mitigation Design from Shoreline Seedling Colonization (*selected*).
Patterns April 12-14. 2012. (*Poster presentation based on MS thesis*)

New England Invasive Plant Summit, Framingham Massachusetts: Wetlands permitting – a potentially powerful tool to control invasive plants. September 19-20. 2003. (*Poster Presentation*).

Environmentally Sensitive Development along the Ten Mile River. Riverside Landscaping Conference. The Rivers Alliance of Connecticut. June 1998. (*Guest Lecturer*)

Water Quality in the Quinnipiac River: A Symposium on the Impact of Non-Point Source Pollution in the Quinnipiac River Watershed. November 1998. (*Presenter*)

October, 2014. Documenting and Conserving Eastern Box Turtles in Central Connecticut: 19 years of Citizen Monitoring. Berlin Land Trust and Nature Center. Evening Membership Program. (*Guest Lecturer*)

2011 to 2119. For CT Botanical Society, have led 1-3 guided botany field trips and/or field botany workshops each year.

October 2016 Sigrun Gadwa ,MS & Todd Mervosch PHD. Connecticut Invasive Plant Working Group (CIPWG) Symposium, UConn College of Agriculture, Health, & Natural Resources. *Artemisia vulgaris (Mugwort): Overlooked Infiltrator of Meadow Habitats*. (*Poster Presentation*).