STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
APPLICATION OF NEW CINGULAR WIRELESS PCS, LLC FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A TELECOMMUNICATIONS FACILITY AT 95 BALANCE ROCK ROAD, HARTLAND, CONNECTICUT	:	DOCKET NO. 408
	:	JANUARY 4, 2011

PRE-FILED TESTIMONY OF GEORGE T. LOGAN, MS, PWS

Question No. 1

Mr. Logan, please describe your educational background and professional experience.

Response

I earned a B.S. in Natural Resources, Wildlife Management & Wetlands Ecology at University of Rhode Island, Kingston, R.I. in 1986 and an M.S. in Natural Resources, Wildlife Management & Conservation Biology at the University of Rhode Island, Kingston, R.I. in 1989. I am a Certified Ecologist (2004-Present) (Ecological Society of America), a Registered Soil Scientist (1989-Present) (Society of Soil Scientists of Southern New England), a Certified Professional Wetland Scientist (No. 581) (1994-Present) (Society of Wetland Scientists) and a Certified Associate Wildlife Biologist (1989-Present) (The Wildlife Society).

I am a member of the Society of Soil Scientists of Southern New England, the Society of Wetland Scientists, the Ecological Society of America, The Wildlife Society, the Soil & Water Conservation Society, and the Connecticut Association of Wetland Scientists (CAWS) (Past-President, Charter Member)

I am the Co-Owner and Principal Environmental Scientist of Rema Ecological Services, LLC, and specialize in tidal and inland wetland delineation and evaluation, permitting, mitigation design, and the preparation of environmental compliance documents in accordance with national (NEPA), state, and local criteria and guidelines. I also provide design, construction supervision and implementation of habitat and wetland restoration, enhancement and replacement projects. I perform watershed and surface water quality evaluations and provide guidance in the design of stormwater Best Management Practices (BMPs), including stormwater wetlands and bioretention basins, as well as for many LID (low impact development) practices. I have over twenty-two years experience as a wildlife biologist conducting wildlife habitat evaluations and focused avian, mammalian, invertebrate, and herpetofaunal surveys using both active and passive methods. I frequently conduct targeted surveys for sensitive, rare, and "listed" species, and aquatic biosurveys to assess the biodiversity and biotic health of ponds, lakes, vernal pools, rivers, and streams. I have extensive experience in performing herpetological surveys including vernal pool investigations and evaluations. I have participated in nearly 2,000 individual projects in New England and the Mid-Atlantic States and in 154 of 169 municipalities in Connecticut.

Further details regarding my qualifications are contained in my professional resume.

Question No. 2

Have you had the opportunity to review the application which is the subject of Connecticut Siting Council Docket No. 408?

Response

Yes. At the request of our client, Mr. Thomas Sirman, who resides at 88 Balance Rock Road, immediately across and to the south of the above-referenced property, we have reviewed the application, the application exhibits, and all available materials relating to the proposed location of the cellular communications tower at 95 Balance Rock Road, including plans and various communications, for compliance with commonly accepted practices for proposals reviewed by the Connecticut Department of Environmental Protection and Town Inland Wetlands and Watercourses Agencies in Connecticut, and for consistency with the provisions of the Inland Wetlands and Watercourses Act, Connecticut General Statutes Section 22a-36 through 22a-45, inclusive.

Question No. 3

Did you visit the site?

Response

We visited the property at 95 Balance Rock Road on October 3, 2010. The property, which is surrounded on three sides by the Tunxis State Forest, was posted, so we did not enter. We did walk around the property in order to examine the terrain and

resources in the surrounding area. Subsequently, we requested permission to enter the property by sending letters to the property owner and the applicant's attorneys. The applicant's attorneys refused to grant us permission to enter the property; the property owner did not respond to our letter.

Question No. 4

Do you believe that the application and accompanying materials are sufficiently detailed and complete to evaluate the impact of the proposed cellular communications tower on the inland wetlands and watercourses, flora and fauna on and in the vicinity of the property at 95 Balance Rock Road?

Response

No, I do not. I find that this application and the materials accompanying it lack sufficient detail and documentation to ascertain potential short-term and long-term direct and indirect impacts upon statutorily regulated resources, that is, wetlands and watercourses, as well as to other ecological resources both on-site and off-site. The information provided by the applicant is incomplete and precludes a thorough and informed review by the Connecticut Siting Council, the Council on Environmental Quality, the Department of Environmental Protection, the Hartland Town Land Use agencies, and by the public.

Question No. 5

Would you explain why you believe that the applicant's submissions lack sufficient detail for an adequate evaluation of environmental impacts?

Response

The applicant submitted two wetlands delineation reports: (1) A Wetland & Watercourse Delineation Report by Kleinfelder, dated December 3rd, 2009; and (2) A Wetlands Delineation Report by Vanasse Hangen Brustlin, Inc. (VHB), dated September 7th, 2010.

These two "wetlands" reports are quite limited in scope, dealing primarily with the delineations of on-site wetlands and watercourses. Reasonably complete field inventories and resource characterization are lacking, and what was done took place outside of normal conditions for proper inventories. The VHB site visit was on August 25th, 2010 at the tail end of a drought period. According to the NOAA National Climatic Data Center, in 2010 Connecticut experienced severe drought in April, moderate to severe drought in May, moderate drought in June, and was abnormally dry July through September. The Kleinfelder site visit took place on October 19th, 2009, which is outside of the growing season for this part of Connecticut. According to the Connecticut Department of Environmental Protection, October 6th is the average first-frost date for the Northwest Hills, which includes the property at 95 Balance Rock Road, which has elevations above 1,100 feet. Many wetland and watercourse-dependent species would not be evident in these conditions.

Additionally, an intermittent watercourse was identified in Wetland A (eastern wetland on the site), yet it was not surveyed and does not even appear on the site plan submitted with the application. The same is true for an identified depressional area in

Wetland B (western wetland on the site). Moreover, topography is mostly or completely lacking within the site's wetlands and watercourses, which could be impacted from the proposal.

Question No. 6

When should field inventories and resource characterization be done?

Response

According to the available reports, and secondary source data, the site's wetlands are "headwater" or hillside seepage wetlands or seeps, which are most often considered sensitive wetlands. These must be inventoried in the spring to properly assess their biodiversity and function. For instance, "surface springs, cold headwater streams, and seeps," are recognized in "Thirteen of Connecticut's Most Imperiled Ecosystems" (Metzler and Wagner 1998; cited in "Connecticut's Comprehensive Wildlife Conservation Strategy" (CT DEP 2005).

Since inventories were not conducted during the proper time of season, spring ephemerals (i.e. herbaceous species that are typically present and best inventoried only during the spring season) are not listed. Neither is there any indication in the reports of any biota associated with the intermittent stream which was identified as being present on the site during times of higher flows (i.e. Spring) nor is any amphibian activity recorded during their breeding season (i.e. Spring).

Question No. 7

Does the applicant include a functional analysis of the on-site wetlands and watercourses resources? Do you think that information is necessary in order to make a reasonably informed judgment about the impact of the proposed tower on on-site environmental resources?

Response

An evaluation of commonly recognized functions and values of wetlands and watercourses is lacking from the application materials. Such an evaluation, using one of several available models or methods, including the US Army Corps of Engineers "Descriptive Approach," would give reviewers an understanding of which functions and values are most important, as well as the potential sensitivity of the regulated recourses to the proposal. Such an evaluation is completely lacking from the applicant's submissions, and unfortunately, since the wetland and watercourse inventories are incomplete, would not even be possible at this time.

Question No. 8

Have you identified any inconsistencies in the reports?

Response

Yes, I identified several apparent inconsistencies in the reports. For instance, the Great Laurel (*Rhododendron maximum*) is listed in the Kleinfelder but not in the VHB report. Also, hummock-hollow microtopography is called out for Wetland A as well as an intermittent watercourse that reportedly begins within this wetland, yet the standard

hydrologic regimes associated with such features, that is, seasonally flooded, and seasonally saturated-seepage, are not checked as being present.

Question No. 9

What additional information, if any, would be necessary in order properly to evaluate the impact of the proposed cell tower on inland wetlands and watercourses?

Response

Water quality of the stream and wetlands are assumed to be Class A, yet no surface water quality monitoring for common parameters was conducted. This would provide valuable information such as regarding the trophic level of the stream and wetlands, which could be characterized by low nutrient availability, making them quite sensitive to alterations during construction and also post-construction. There is also no discussion of down-gradient and off-site regulated resources that could be sensitive to this proposal, particularly surface water resources.

No details of any proposed erosion and sedimentation controls are discussed in the application materials or shown on the plans. This also renders the proposal incomplete.

Finally, and significantly, a small depressional area is identified within Wetland B by the Kleinfelder report, yet the VHB report does not check for Vernal Pool under the Special Aquatic Habitat section of the Field Form, although the seasonally flooded hydrologic regime is checked, which is the most common regime for vernal pools. Based on this information it is very likely that the depressional area in Wetland B is a vernal pool with breeding habitat for typical vernal pool amphibians such as wood frog and spotted

salamander (both species have been reported on neighboring properties). Since the proposal is sited within the watershed of this potential vernal pool, with a direct discharge to the intermittent watercourse that flows to this depressional area, it is of paramount importance that a robust inventory be conducted during the amphibian breeding period (i.e. April-May). This type of inventory is standard practice across Connecticut when vernal pool habitats are associated with any proposed development.

In summary, it is my professional opinion that the materials provided with the proposal are inadequate and incomplete and preclude any substantive analysis of potential short-term and long-term direct or indirect impacts to inland wetlands and watercourses on and adjacent to the property at 95 Balance Rock Road.

Question No. 10

The applicant apparently has made inquiry into the Connecticut Department of Environmental Protection Natural Diversity Database relative to listed species (i.e., endangered, threatened, special concern) that may be present in the vicinity of the site. Is this sufficient to identify such species, in your professional opinion?

Response

I do not believe so. The CT DEP in their response letters to queries, even when the NDDB does show a listed species occurrence in the vicinity of a given site, typically state the following: "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." Therefore, it is my opinion

that the applicant should have conducted comprehensive inventories of the site's natural resources, including wetlands and watercourses, and at the proper seasons, to ascertain the presence, or not, of any "listed species."

Question No. 11

What studies were conducted and what resources did the applicant use to determine that the proposed cellular communications tower would not be located in any known bird concentration areas or known migratory or daily movement flyways?

Response

The applicant used a variety of desktop-ready State and regional resources, including the CT DEP Migratory Waterfowl Data (1999), and the Important Bird Areas and Sites (IBAs) produced by Audubon Connecticut. However, the applicant did not consult directly with credible experts with local knowledge of avian flyways, such as Patrick Comins, Director for Bird Conservation with Audubon Connecticut, or David Rosgen, Wildlife Biologist with the White Memorial Foundation in Litchfield, who is also a major data contributor to the "Atlas of Breeding Birds of Connecticut" (Bevier 1994; CT DEP Bulletin No. 113).

Mr. Comins commented that the main reason that the Barkhamsted Reservoir was not listed in their Important Bird Areas list (27 sites) is because the CT DEP insists that areas with a high concentration of public land, used for recreation, not be included in such lists. He did, however, point me to Figure 1.6 in the CT DEP's "Connecticut's Comprehensive Wildlife Conservation Strategy" (CT DEP 2005), which was generated by

Audubon Connecticut, entitled, "Audubon Key Bird Habitats in Connecticut" (Chapter 1, Page 14; attached). This figure clearly shows the Barkhamsted Reservoir and environs as a "key bird habitat" in Connecticut.

Mr. Rosgen confirmed that the Barkhamsted Reservoir, including the two ridges that flank it to the west and east, is one of the major north-south migratory flyways in Connecticut, for waterfowl and for hawks, the latter also noted by the applicant by the presence of two major "watch sites" in their "Avian Resources Map" (i.e. Booth Hill on the western ridge, Pine Mountain on the eastern ridge). But more importantly the Barkhamsted Reservoir area is a major flyway for migratory songbirds, which include rare and declining Neotropical migrants. These songbirds, which typically fly higher in good weather, fly well within 200 feet of the ground during inclement weather and during foggy conditions.

Moreover, Mr. Rosgen pointed out that there are thousands of acres of unfragmented and marginally fragmented forest associated with the Barkhamsted Reservoir, such as in Tunxis State Forest and adjacent land, including watershed (MDC) land (see Figures 1 and 2, attached). This wilderness-type area is highly suitable avian habitat for fragmentation-sensitive Neotropical songbirds, and, therefore, it is an area of significant bird concentrations.

Also, another source, the "Connecticut Birding Guide" (Divine and Smith 1996) cites the Barkhamsted Reservoir as an important area for waterbirds and waterfowl during

the Spring and Fall migration (page 75). Sightings here include those of rare species such as red-necked grebe, lesser scaup, and redhead.

Because, as attested in the above, the proposed facility lies within a major migratory flyway, and an area of significant bird concentrations, and also because the science literature shows that low (i.e. less than 200 feet in height) unlit telecommunications towers can cause significant bird mortality, particularly at night during rainy and foggy conditions (Manville 2005, Wylie 1977), we conclude that the proposed tower at 95 Balance Rock Road will in all likelihood have a long-term significant adverse effect upon avian populations, throughout a given year, but particularly during the Spring and Fall avian migratory periods.

The statements above are true and complete to the best of my knowledge.

1/5/11
Date

George T. Logan

Subscribed and sworn to before me on this 5th day of January, 2011.

~~Notary Public~~
Commissioner Superior Court
DAVID F. SHERWOOD

CERTIFICATE OF SERVICE

I hereby certify that on the 6th day of January, 2011, a copy of the foregoing document and attachments was sent, first class U.S. mail, postage prepaid, to:

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David F. Sherwood
Commissioner of the Superior Court

LITERATURE CITED

1. CT DEP. 2005. Connecticut's Comprehensive Wildlife Conservation Strategy. CTDEP Bureau of Natural Resources and Terwilliger Consulting, Inc. (683 pages).
2. Manville, A.M., II. 2005. Bird strikes and electrocutions at power lines, communication towers, and turbines: state of the art and state of the science – next steps toward mitigation. Bird Conservation Implementation in the Americas: Proceedings 3rd International Partners in Flight Conference 2002, C.J. Ralph and T.D. Rich, Editors. USDA Forest Service General Technical Report PSW-GTR-191, Pacific Southwest Research Station, Albany, CA: 1051-1064.
3. Divine, A. and D.G. Smith. 1996. Connecticut Birding Guide. Thomson-Shore, Inc., Dexter, Michigan.
4. Bevier, L.R. 1994. The Atlas of Breeding Birds of Connecticut. State Geological and Natural History Survey of Connecticut, Department of Environmental Protection. CT DEP Bulletin 113.

PROFESSIONAL RESUME

George T. Logan, MS, PWS

Principal Environmental Scientist

EDUCATION:

M.S. Natural Resources, *Wildlife Management & Conservation Biology,* University of Rhode Island, Kingston, R.I. 1989.

B.S. Natural Resources, *Wildlife Management & Wetlands Ecology,* University of Rhode Island, Kingston, R.I. 1986.

Continuing Education

The Transportation Project Development Process: Training in the PennDOT Environmental Impact Statement Handbook, Harrisburg, PA, January 1994

Rapid Bioassessment Protocols of Aquatic Systems (EPA Protocols), Wetland Training Institute, Williamsport, PA, August 3-6, 1993

QUALIFICATIONS:

Certified Ecologist *(2004)* - The Ecological Society of America

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

Certified Professional Wetland Scientist (No. 581) *(1994)* - Society of Wetland Scientists

Certified Associate Wildlife Biologist *(1989)* – The Wildlife Society

EXPERIENCE:

Mr. Logan is the Co-Owner and *Principal Environmental Scientist* of Rema Ecological Services, LLC. Mr. Logan specializes in tidal and inland wetland delineation and evaluation, permitting, mitigation design, and the preparation of environmental compliance documents in accordance with national (NEPA), state, and local criteria and guidelines. He also provides design, construction supervision and implementation of habitat and wetland restoration, enhancement and replacement projects. Mr. Logan performs watershed 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 many LID (low impact development) practices.

Mr. Logan has over twenty-two years experience as a wildlife biologist conducting wildlife habitat evaluations and focused avian, mammalian, invertebrate and herpetofaunal surveys using both active and passive methods. He frequently conducts targeted surveys for sensitive, rare, and "listed" species, 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 vernal pool investigations and evaluations.

Mr. Logan has participated in nearly 2,000 individual projects in New England and the Mid-Atlantic States and in 154 of 169 municipalities in Connecticut.

Professional Resume: *(continued)*

George T. Logan, MS, PWS

PROFESSIONAL AFFILIATIONS:

Society of Soil Scientists of Southern New England
Society of Wetland Scientists
Association of Massachusetts Wetland Scientists
Ecological Society of America
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. 66-70.

Logan, G.T. & S.N. Gadwa. 1998. Stream Biosurveys: *A Primer.* Quinnipiac River Watershed Association Educational Series for the Adopt-the-River Programs.

Pawlak, E.M. & G.T. Logan. 1996. Town of Cromwell Wetland Evaluation Project. Connecticut Association of Conservation and Inland Wetlands Commissions. The Habitat, Vol. 10:1

Logan, G.T., F.B. Titlow & D.G. Schall. 1995. The Scientific Basis for Protecting Buffer Zones. Proceedings of the 16th Annual Meeting of the Society of Wetland Scientists.

Pawlak, E.M. & G.T. Logan. 1995. Town of Cromwell Wetland Buffer Zone Designation Methodology. Proceedings of the 16th Annual Meeting of the Society of Wetland Scientists.

Logan, G.T., J.H. Brown, Jr., T.P. Husband & M.C. Nicholson. 1994. Conservation Biology of the Cretan Agrimi (*Capra aegagrus cretensis*). Biologia Gallo-Hellenica, Vol. 21, pp. 51-57.

Nicholson, M.C., T.P. Husband, J.H. Brown, Jr. and G.T. Logan. 1994. Implications of behavior on the management of the Cretan Agrimi (*Capra aegagrus cretensis*). Biologia Gallo-Hellenica, Vol. 21, pp. 45-50.

WORKSHOPS & CONFERENCES: ***(selected)***

Vernal Pools: *The Jewels of the Forest.* Technical Workshop for the Town of Southwick Conservation Commission. January 2005. *(Guest Lecturer)*

Professional Resume: *(continued)*

George T. Logan, MS, PWS

WORKSHOPS & CONFERENCES: ***(selected)***

The Importance of Habitat Edges. Riverside Landscaping Conference. The Rivers Alliance of Connecticut. June 1998. (*Guest Lecturer*)

Riparian Buffer Function, Performance & Limitations. Urban Riparian Buffers Conference & Technical Training Session. April 1999. *(Guest Lecturer)*

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

Buffer Strips as Storm Water Quality Controls. EnviroExpo, Boston. May 1999. *(Guest Speaker)*

Identifying Wetland Soils, Fauna and Flora. Municipal Inland Wetland Staff Technical Workshops. June 1999. *(Guest Speaker)*

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

Our Hidden Wetlands: Vernal Pools in Connecticut. Co-sponsored by CT DEP and the Center for Coastal and Watershed Systems. November 1997 and January 1998 *(Workshop Leader)*

Aquatic Invertebrate & Stream Ecology Workshop. Quinnipiac River Watershed Association Workshop Series. September 1997, May 1998, June 1999, January 2000 (*Workshop Leader*)

The Massachusetts Association of Conservation Commissions Third Annual Conference: Wetland Buffer Zones, March 1996 (*Guest Lecturer*)

16th Annual Conference of the Society of Wetland Scientists: Wetland Understanding, Wetland Education, May 1995 (*Presenter*)

Quinnipiac River Watershed Association Forum on Non-Point Pollution: Significance of Wetlands and Wetland Buffers, October 1992 (*Guest Lecturer*)

The Massachusetts Association of Conservation Commissions Second Annual Conference, April 1995 (*Guest Lecturer*)

The Society of Soil Scientists of Southern New England Riparian Buffer Zone Conference, November 1994 (*Presenter*)

Professional Resume: *(continued)*

George T. Logan, MS, PWS

SUPPLEMENTARY INFORMATION:

1996 to present

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

- Founded the company to provide natural resources management, environmental planning, compliance services, and client advocacy throughout the Northeast.
- Has participated in over 1,500 individual projects since the company's inception including four gas-fired, combined-cycle power plant projects, numerous wetland replacement projects, and many large residential, industrial and commercial endeavors.
- Acted as the Town of Waterford, Connecticut, Interim Environmental Planner during a ten-month tenure. Responsibilities included providing procedural and technical support to the town's Conservation Commission (a.k.a. Inland Wetlands and Watercourses Agency).

1994 to 1996

Fugro East, Inc. *(Currently ENSR-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 improvement 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 30 projects, mostly for major transportation corridors.

Professional Resume: *(continued)*

George T. Logan, MS, PWS

SUPPLEMENTARY INFORMATION *(continued):*

1989 to 1993

Soil Science & Environmental Services, Inc.
Wildlife Biologist & Soil Scientist

- Acted as Project Manager responsible for field operations and report preparation for nearly 300 individual projects in over 75 towns in New England, including one town-wide wetland mapping, inventory and evaluation project.
- Wetland boundary delineation according to state and federal criteria (e.g., Connecticut and Massachusetts Statutes, USACOE 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 biosurveys 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 amending 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 an invasive plant (*Phragmites australis*) on eight TWC preserves. Scope included site visits, remote sensing using archived aerial photographs, and report.

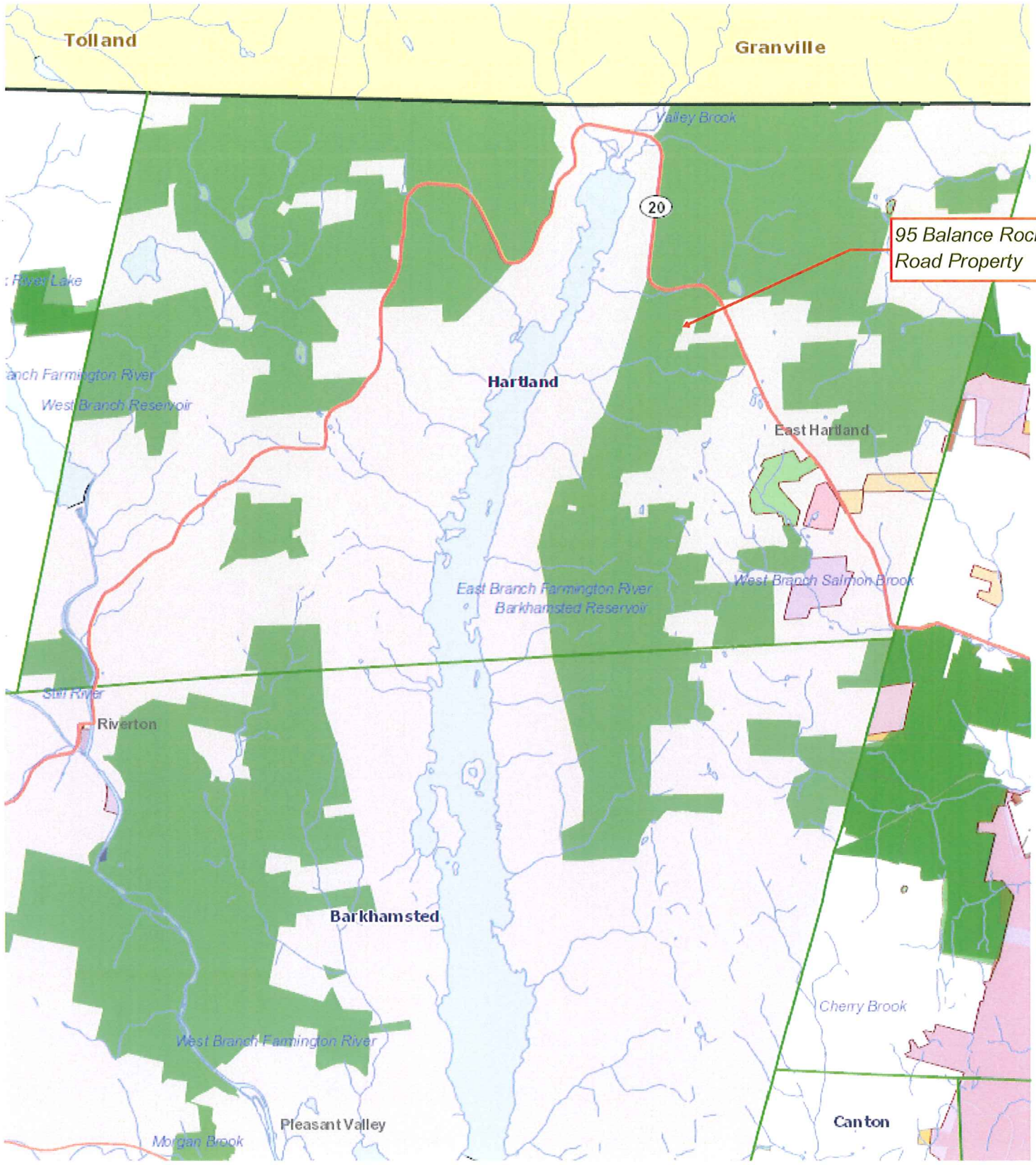
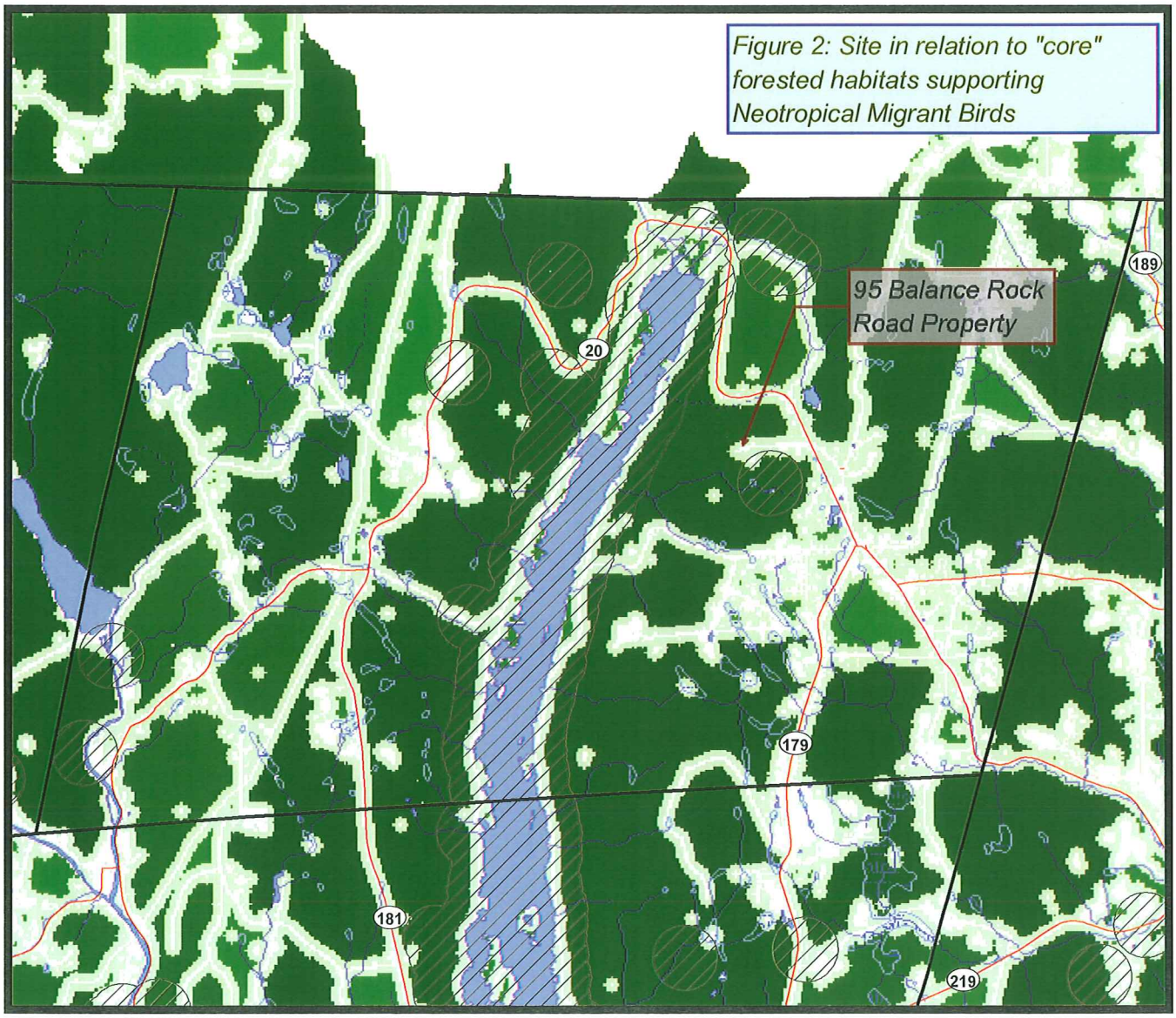


Figure 1: Site in relation to surrounding protected forested areas (i.e. State Forest)

Hartland, CT

Habitats

Community Resource Inventory Map Series



Legend

- Towns
- Major Highway
- Primary Route
- Secondary Route
- Ramp
- NDDB Area
- Water
- Intermittent Water
- Marsh

Core Forest

- Fragmented Forest
- Core (< 250 ac)
- Core (250-500 ac)
- Core (500+ ac)

N

0 0.25 0.5 1 1.5 Miles

More Information: Visit http://clear.uconn.edu/projects/cri

Data source: All data layers from CT DEP http://www.ct.gov/dep/gis/

Natural Diversity Database updated December 2008. Core Forest derived from 2006 land cover.

This project was funded in part by the CT DEP through an EPA Clean Water Act Section 319 Nonpoint Source Grant. NEMO is an educational program of the Center for Land use Education and Research (CLEAR) at the University of Connecticut.

These maps are intended for general information and planning purposes only. They contain no authoritative positional information.

NEMO CLEAR EPA United States Environmental Protection Agency

Version 5/5/09

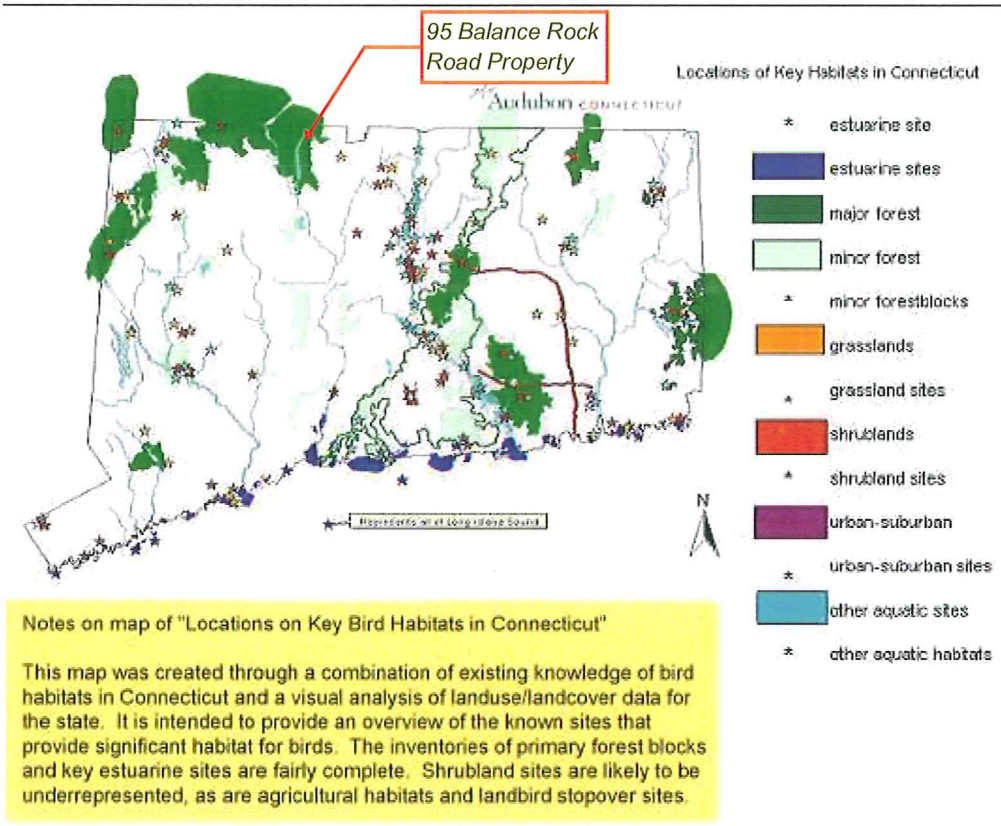


Figure 1.6 Audubon Key Bird Habitats in Connecticut (Source: Audubon Connecticut)

Reptiles and Amphibians (Herpetofauna)

Sources of information for herpetofauna are listed in this section and summarized in Appendix 1a. Appendix 1b lists all herpetofauna, as well as the full array of wildlife currently known to be present in Connecticut, along with status rank and information on abundance and distribution, including low and declining populations. All scientific names are listed in Appendix 1b.

The herpetofauna of Connecticut are diverse and have been thoroughly described by Lamson (1935), Babbitt (1937), Peterson (1970), and Klemens (1991, 1993, and 2000). SNE-GAP analysis provides maps of predicted amphibian and reptile distribution (Figs 1.7, page 1-14 and 1.8, page 1-15). Klemens (1993) provides regional and state occurrence and distribution maps for Connecticut's amphibian and reptile species. He concludes that the biodiversity of Connecticut's reptiles and amphibians is declining and local extirpations are increasing. Gruner and Victoria (2000) provide an overview of the conservation status of Connecticut's amphibians and reptiles. Appendix 1b details population abundance and distribution information according to the most recent literature and expert opinion. Forty-nine reptile and amphibian species are found in Connecticut. Of the 49, 18 are listed by the state as endangered, threatened, or species of special concern (Table 1.4). Specific listings of GCN herpetofauna species by subgroup and order are shown in Table 1.4. Global evidence also indicates widespread declines in