EXHIBIT
CR 10

Emery Roth II
328 Romford Road
Washington Depot, Connecticut 06794

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

To Siting Council members:

I am a local art photographer living on Romford Road within walking distance of Rabbit Hill. I am not opposed to cell towers, and I actually hope that I may gain cell reception from a tower placed in the area, perhaps even on the Tanner Farm on top of Rabbit Hill. However, as a photographer who shoots landscapes and farmscapes throughout Connecticut, Massachusetts, and New York almost every day, I have a special appreciation of the unique beauty of Rabbit Hill.

As one comes up Jack Corner Rd. from Rt. 341 and reaches the crest of Rabbit Hill the silos and barns and the vista behind them are unique in the region. I have photographed them many times and include a few of my photos below to document this beauty. This ancient farm is one of very few surviving in the area and one of only two with a hilltop setting that tells the story of agricultural Connecticut and the rolling land that made it thrive. Time has taken a toll on the buildings, but from the top of Jack Corner Rd one can easily imagine this vanished past. Nor is it only the farm and the view that make this rural spot important, but the way weather interacts with the hilltop, the way one sees clouds approach from a distance and pass low over the hilltop or that the farm catches light from both the rising and setting sun. Often as I set my tripod beside the road to catch the farm amid some shifting light, cloud, or weather, passing cars will stop, and the drivers will engage me in conversation about these beauties. Sometimes they have taken this road just to pass this view. Clearly, there are many people who treasure this unique spot.

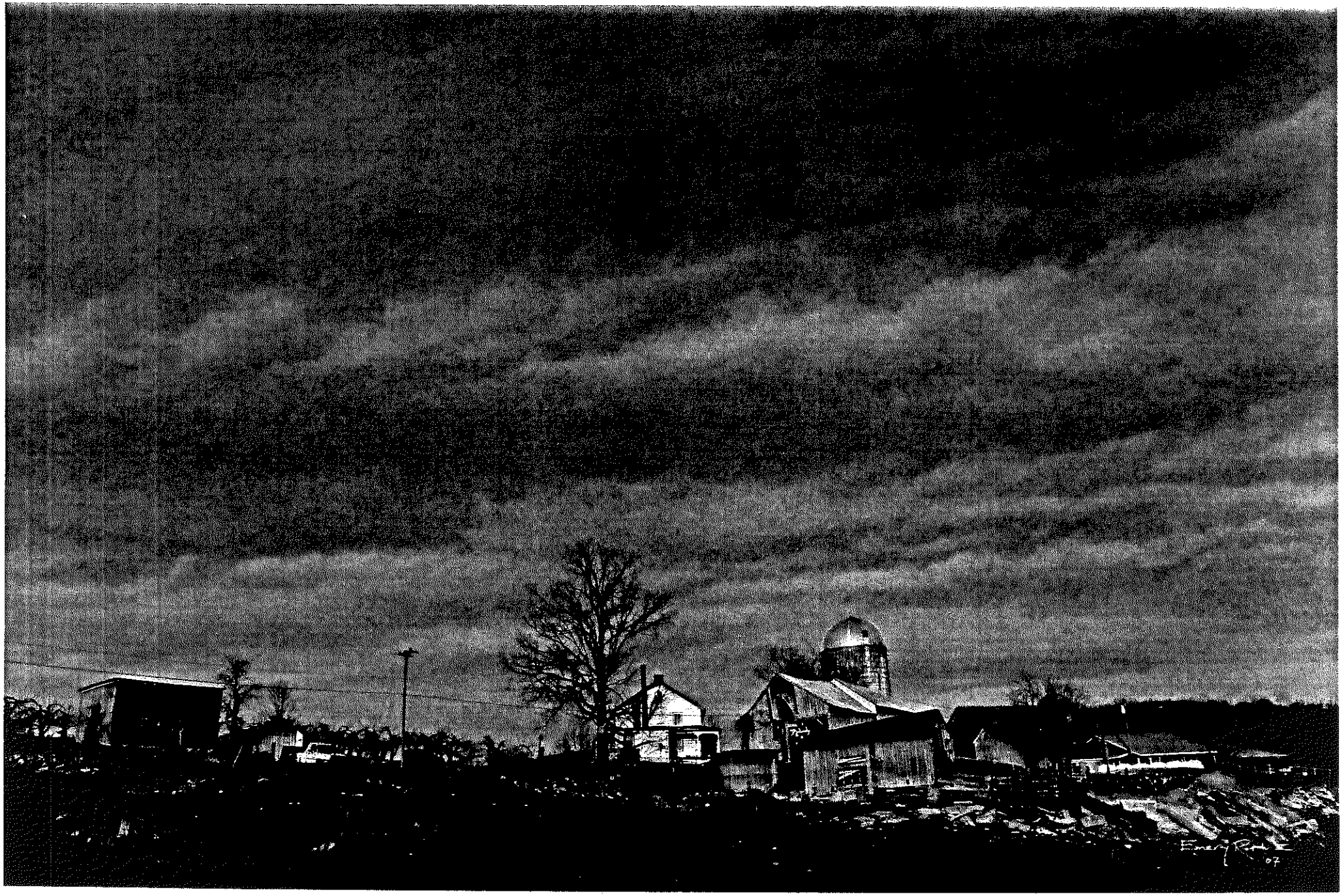
As you deliberate on finding the best site for a new cell tower from whose service I hope to benefit, please do not place it in such a way that it will obtrude into this nearly unspoiled vista. Urban sprawl has claimed too many such locations, and now cell towers as well are becoming part of the rural junkscape. One only has to drive a bit further to see how new homes have spoiled the most spectacular vista of Lake Waramaug. Our rural character is slipping from us. We need a cell tower in the area. Please, not in the this view.

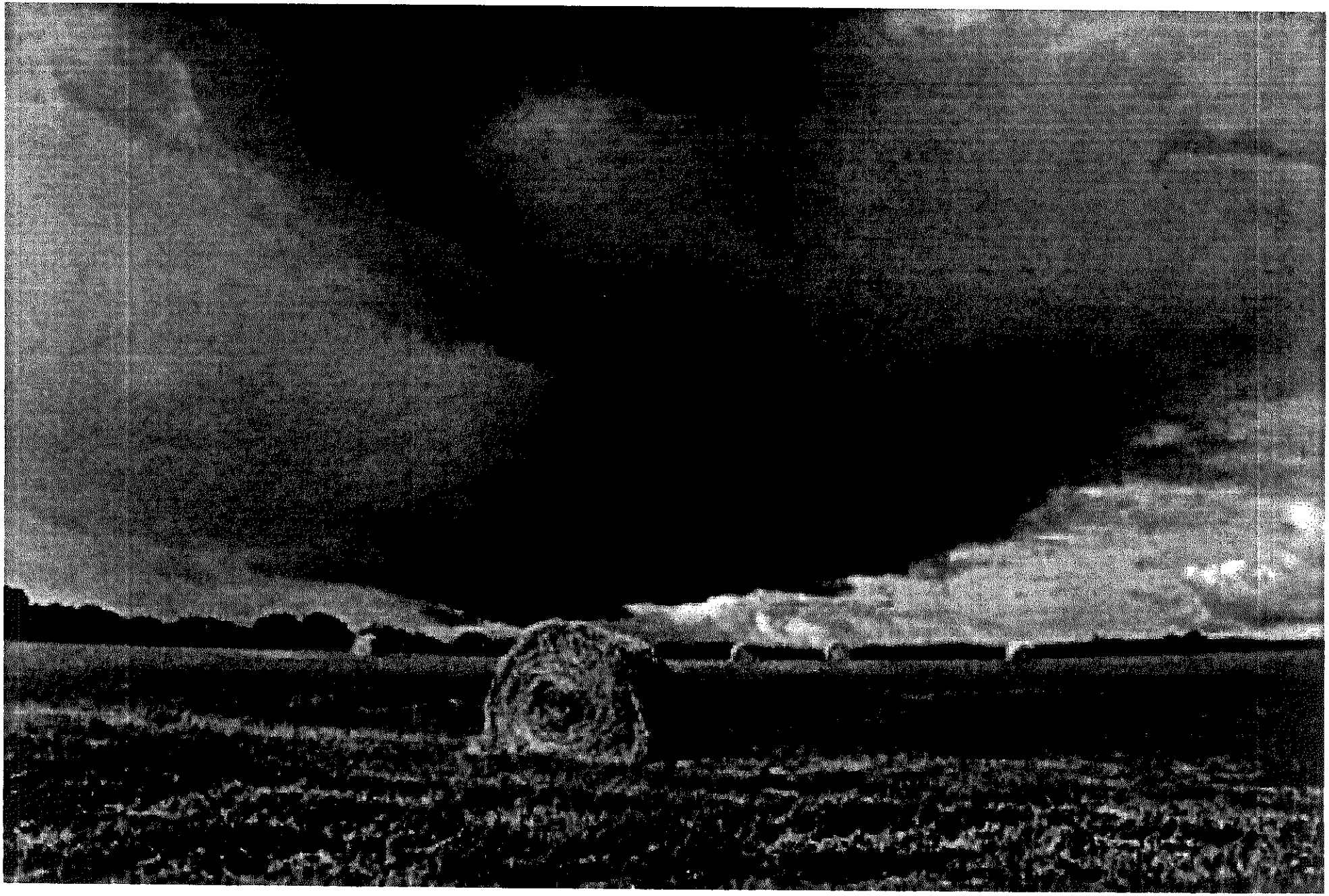
Attached are a few of the images I've made atop Rabbit Hill. These are unfinished, uncalibrated, pre-proof copies.

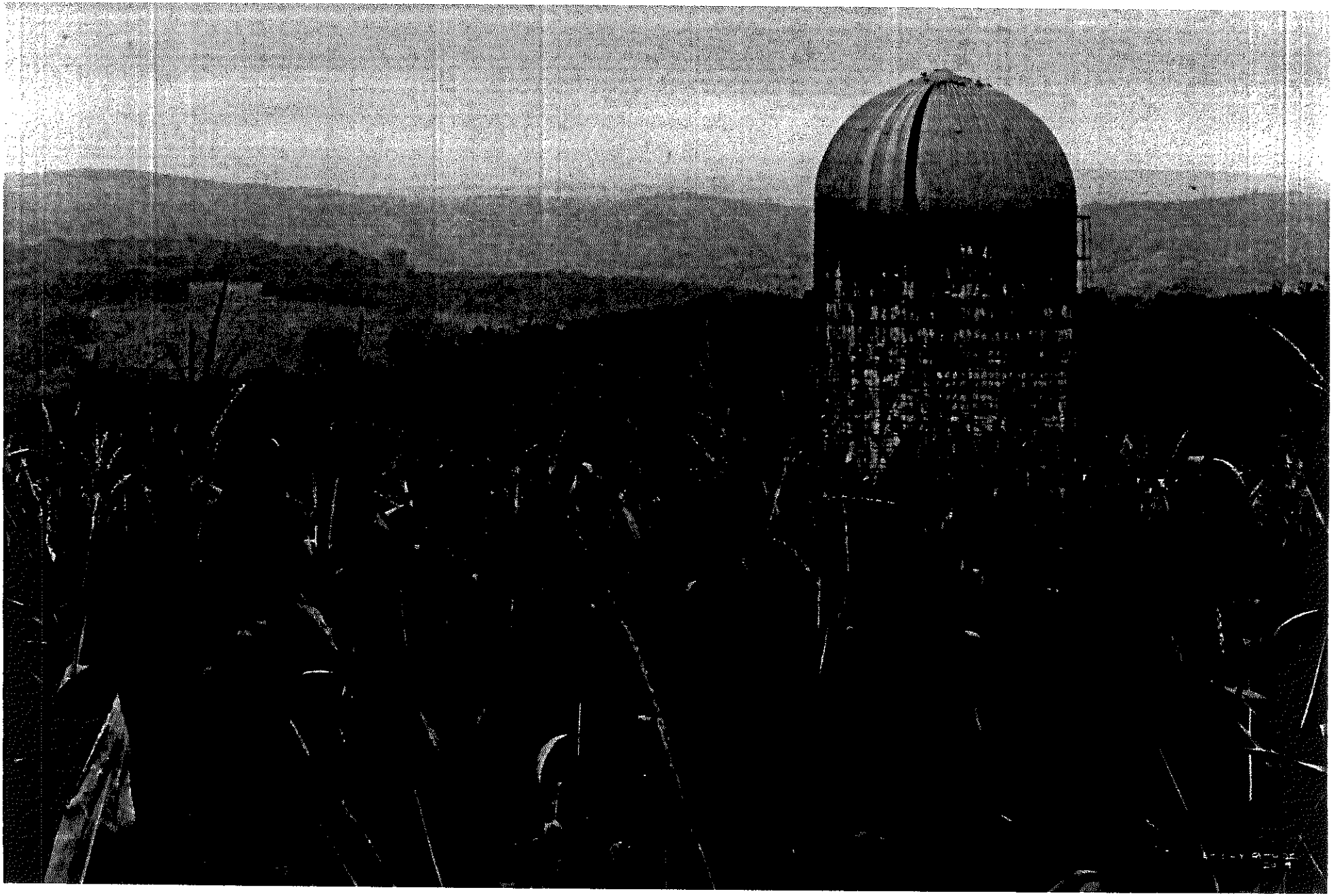
Respectfully,

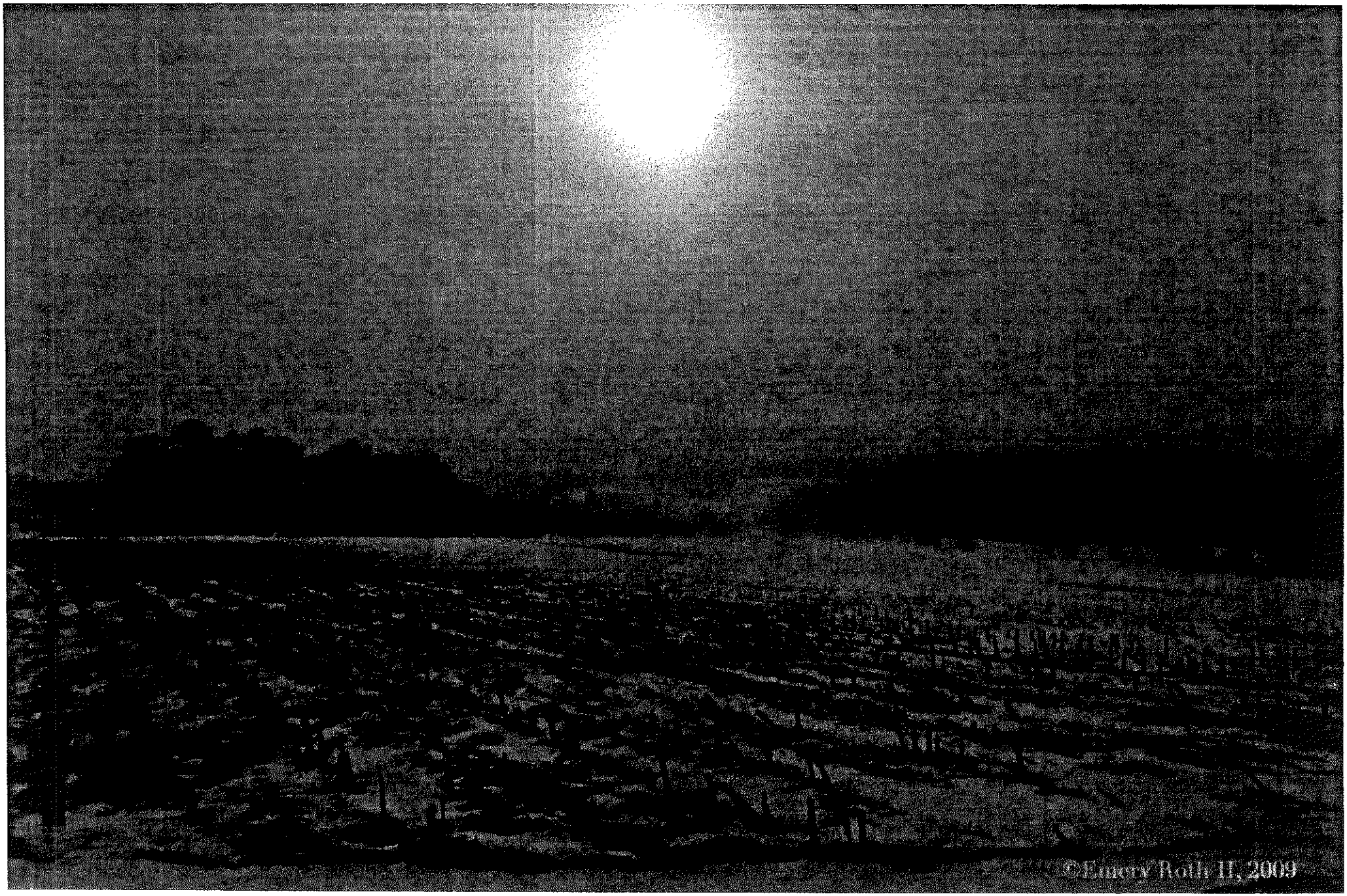
Emery Roth II

cc: CROWW








©Emery Roth II, 2009

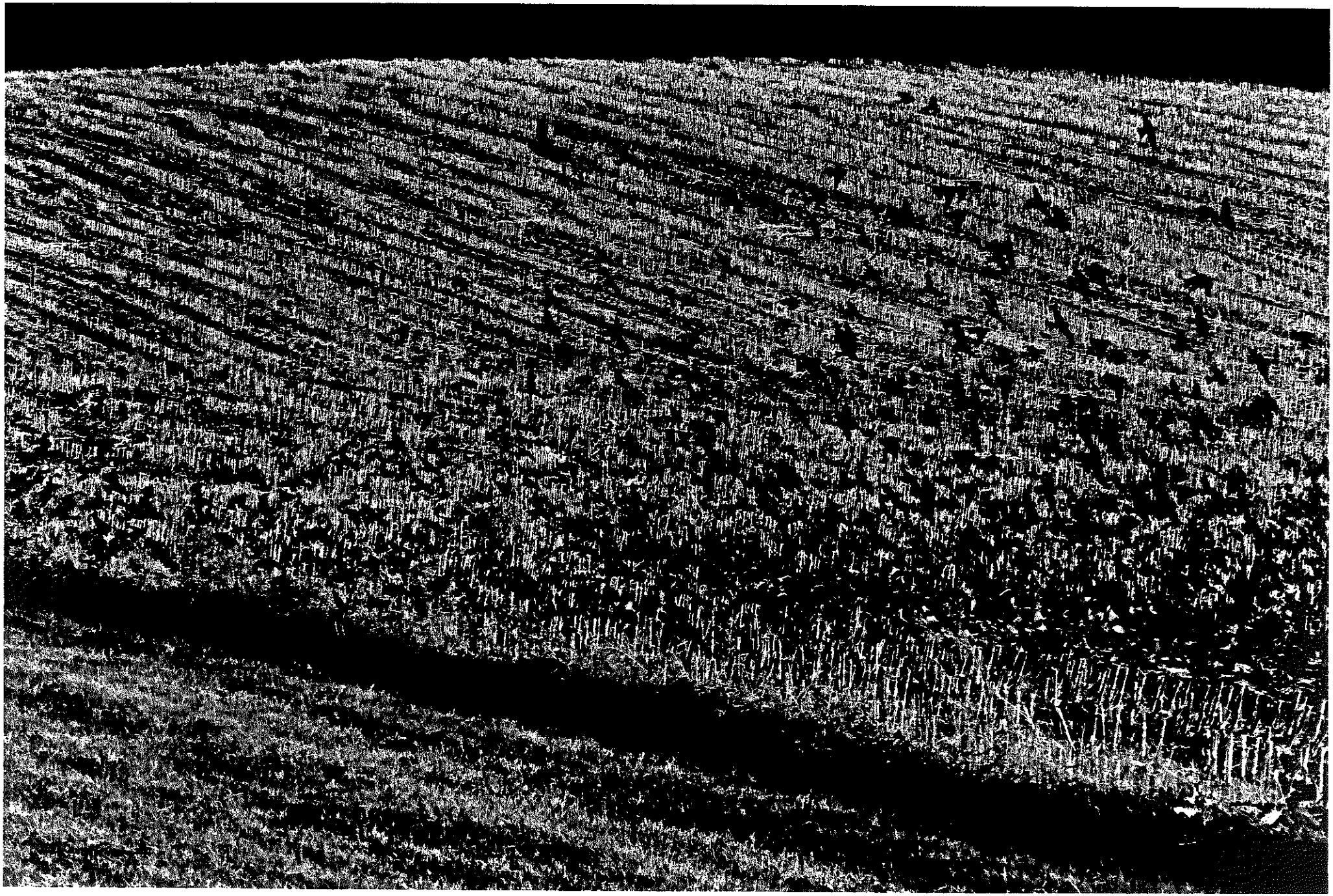


EXHIBIT
CR 11

AFFIDAVIT OF JOHN HART

State of Connecticut]

] ss.

County of Litchfield]

JOHN HART being duly sworn deposes and says:

1. My name is John Hart. I own and reside at 55 Rabbit Hill Road, Washington, Connecticut. My property is across and down the road 160 feet from Luke Tanner's lower field. The Warren/Washington town line runs through my property placing my house along with 1.73 acres in Washington, and my garage along with 2.3 acres in Warren. This has been my residence since 1992.

2. There is a pond on my property, close to an acre in size that regularly attracts birds and animals year around. I confirm my observations of the birds I see and sometimes photograph with The Audubon Society Field Guide to North American Birds, Eastern Region, Chanticleer Press Edition, Thirteenth Printing published November 1985 by Alfred A Knopf, New York.

3. Canada geese have nested on the island in my pond almost every year I have lived here. They did so again this year and I photographed their progress:

Gander on guard, May 7, 2009 [Exhibit A]
Hen on nest May 7, 2009 [Exhibit B]
Parent geese with four goslings on the day they hatched May 11, 2009 [Exhibits C]:
Goslings under wing [Exhibit C (1)]
Goslings on grass [Exhibit C (2)]

4. My property is regularly visited by migratory birds, including the yearly visits of a blue heron that comes to fish the pond and that last appeared last autumn. I took the attached photo of the heron August 27, 2003 [Exhibit D].

5. I have also personally observed the following birds protected under the Migratory Bird Treaty Act:

Wood duck, Aix sponsa (Photo May 8, 2009) [Exhibit E]
Red-tailed hawk, Buteo jamaicensis

Yellow-bellied sapsucker, Sphyrapicus varius
Pileated woodpecker, Dryocopus pileatus
Chickadee, Black-capped, Parus atricapillus
Mourning dove, Zenaida macroura
Cardinal, Northern, Cardinalis cardinalis
Bluebird, Eastern, Sialia sialis
Robin, American, Turdus migratorius
Chipping sparrow, Spizella passerina (Photo may 10, 2009) [exhibit F]

6. I attach the checklist of the migratory birds protected under the Migratory Bird Treaty Act on which I have indicated those birds I have personally observed on my property, a location within 400 yards of the proposed Site A tower and within 485 yards of the proposed Site B tower. This is the official list of birds protected by the Migratory Bird Treaty Act from the U.S. Fish and Wildlife Service as available on the internet at:

http://www.fws.gov/migratorybirds/intrnltr/mbta/mbtandx.html

My bird sightings marked on the list represent my personal observations from July of 1992 to May 14, 2009. I affirm the markings of the attached MBTA bird list to be an accurate record of my observations. That checklist is attached as Exhibit G.

7. Other birds return regularly. Mallard ducks come every year.

8. I have also personally observed the following wildlife on my property:

A colony of more than 100 Little Brown Bats (myotis lucifigus) made their home in my attic and were successfully excluded by Advanced Wildlife Control of Torrington, Connecticut in September 2001.

A black bear has visited at least two seasons within the last six years, using Rabbit Hill Road at times as a path.

Last year a coyote strolled across the yard.

Last year a bobcat traversed the place, walking close to the house.

Early in my residence I saw a red fox dash into the woods.

I have seen several New England Cottontail rabbits.

Wild turkeys are habitués of the woods and grass.

9. I have also personally observed the following reptiles on my property:

I observed two large snapping turtles mating in shallows next to the island in the pond.

The pond is also home to water snakes.

I have found garter snakes nesting in my woodpile.

10. I have also personally observed the following fish on my property:

The pond contains bass, bluegills and grass eating triploid carp.

11. I have also personally experienced the following frogs on my property:

The pond area is seasonally home to banjo frogs, bullfrogs and tree frogs.

12. Small rodents also make a home on my property:

An extended family of chipmunks has resided in my stone fence since before I took up residence in the place.

Squirrels take an annual harvest of acorns from my oak tree.

13. As my property lies in both the Town of Washington and the Town of Warren, I rely on the enforcement of the ordinances and zoning regulations of each town to protect my property and my health and safety, and I rely on the Constitution and laws of the United States to protect my property rights as well as the health and safety of myself and of the many other lives that share my property.

John R. Hart

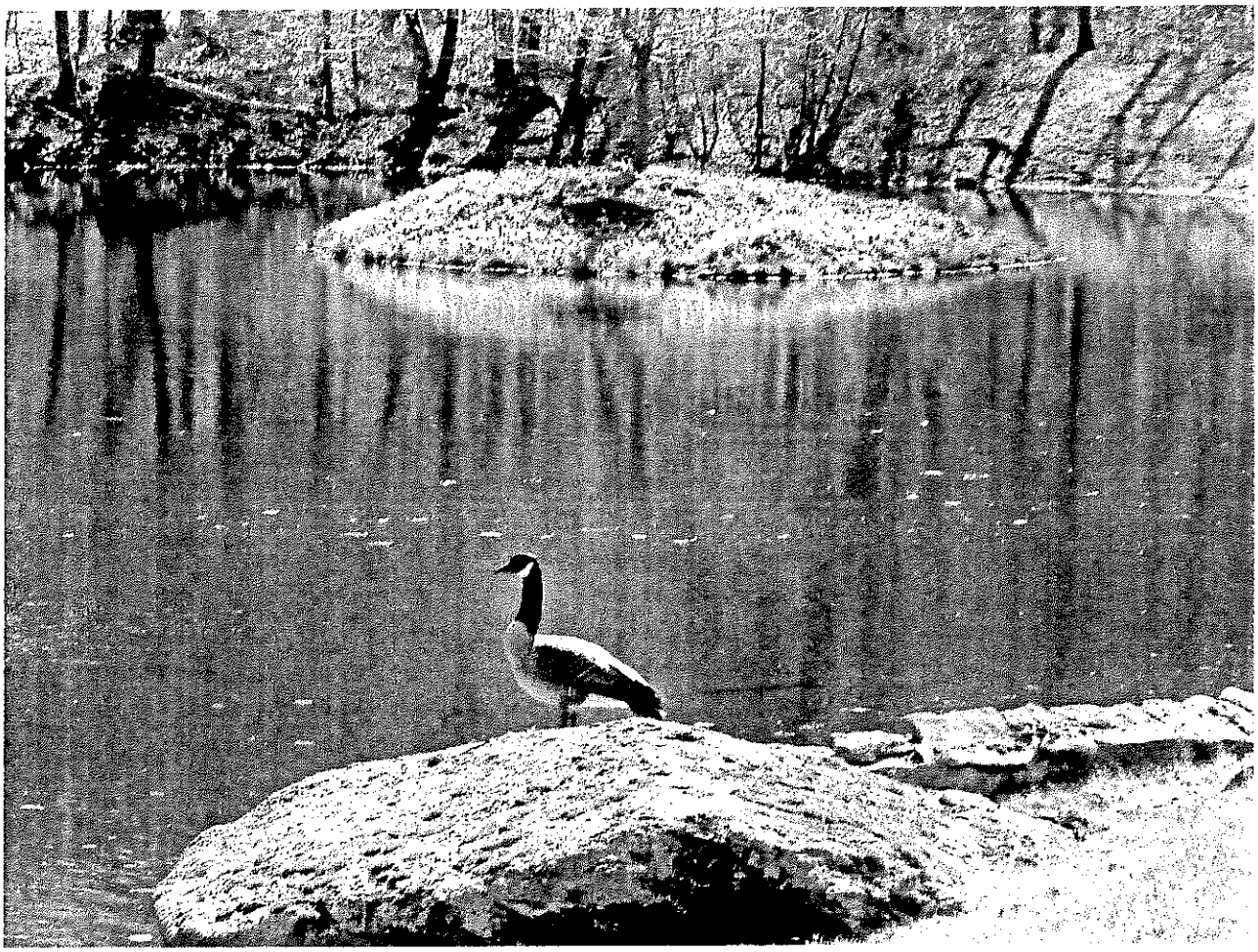
Sworn to before me

This 12th day of May 2009

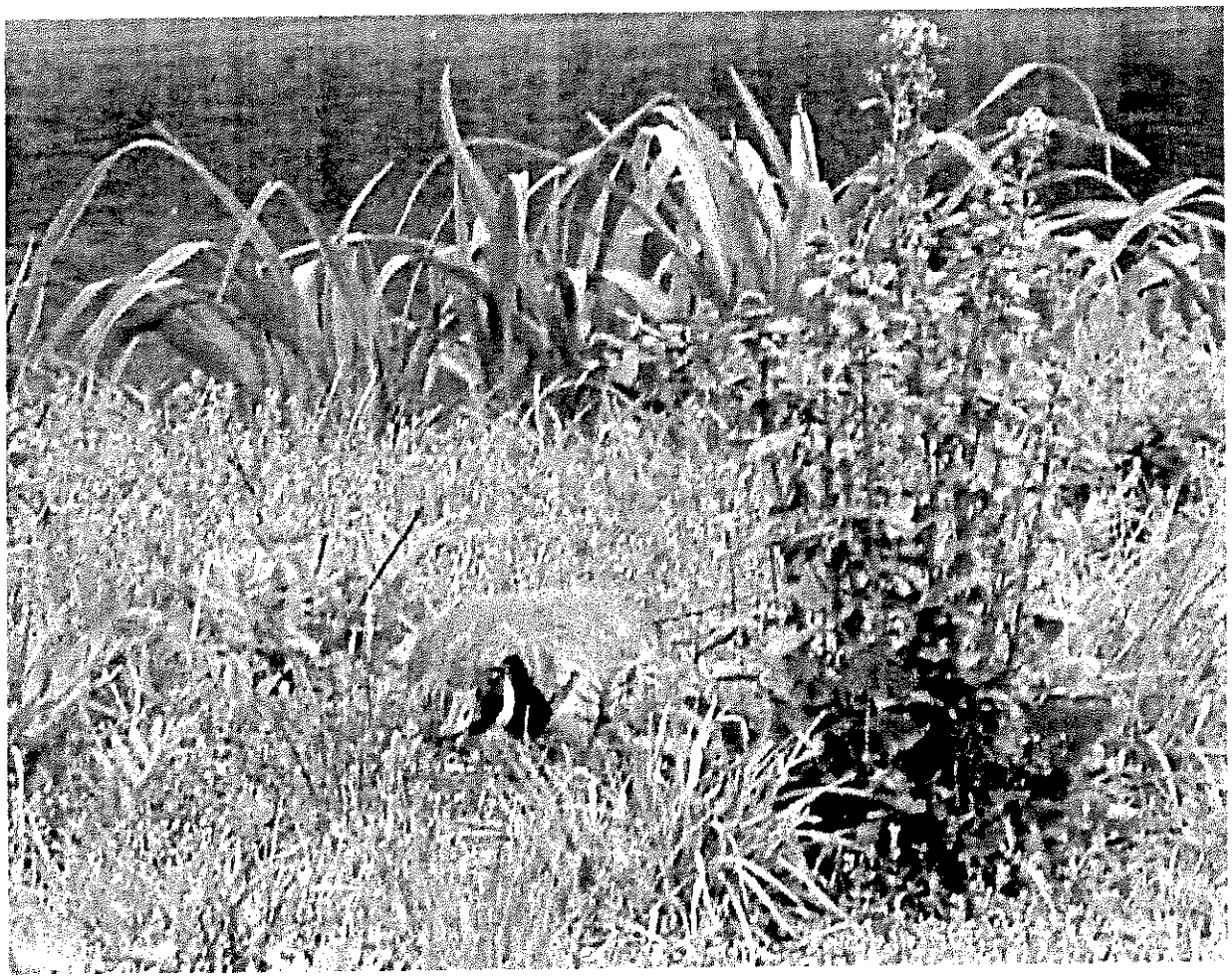
Subscribed and Sworn to before me, A Notary Public,
In and for the County of Litchfield and
State of Connecticut, this 12th day of May 2009

Michelle C Purpora
Notary Public

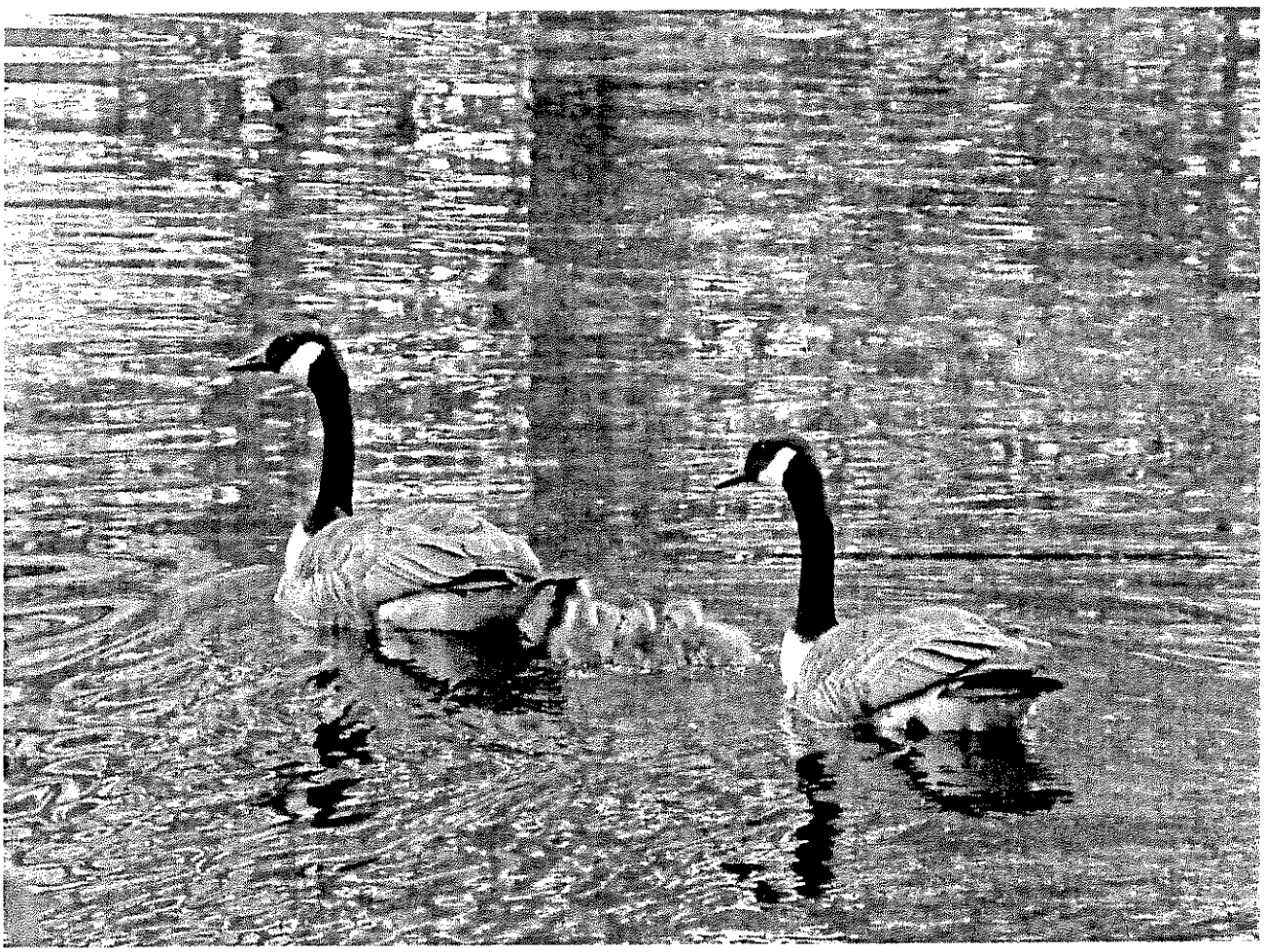
MICHELLE C. PURPORA
NOTARY PUBLIC
My Commission expires March 31,2012



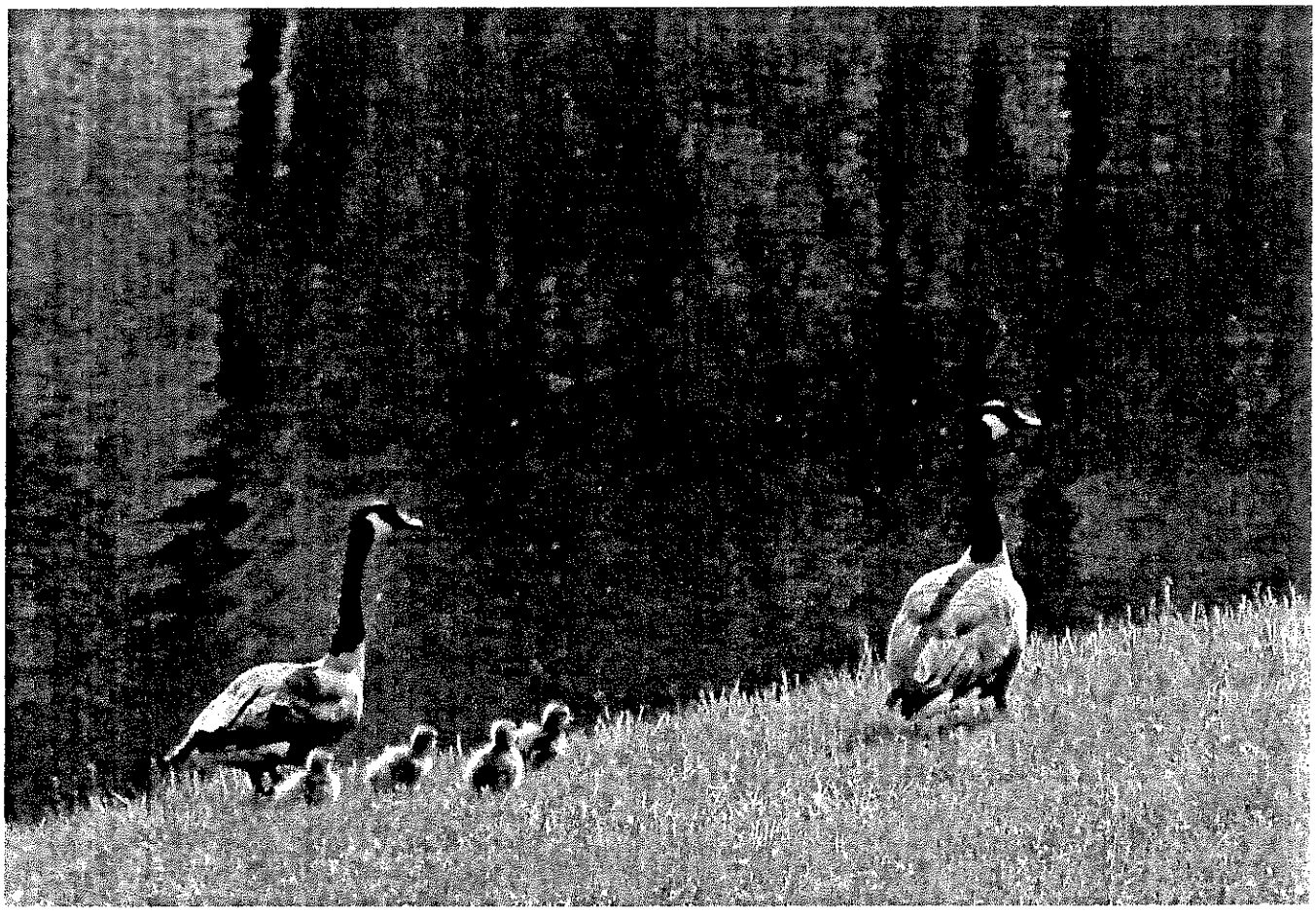
HART EXHIBIT A



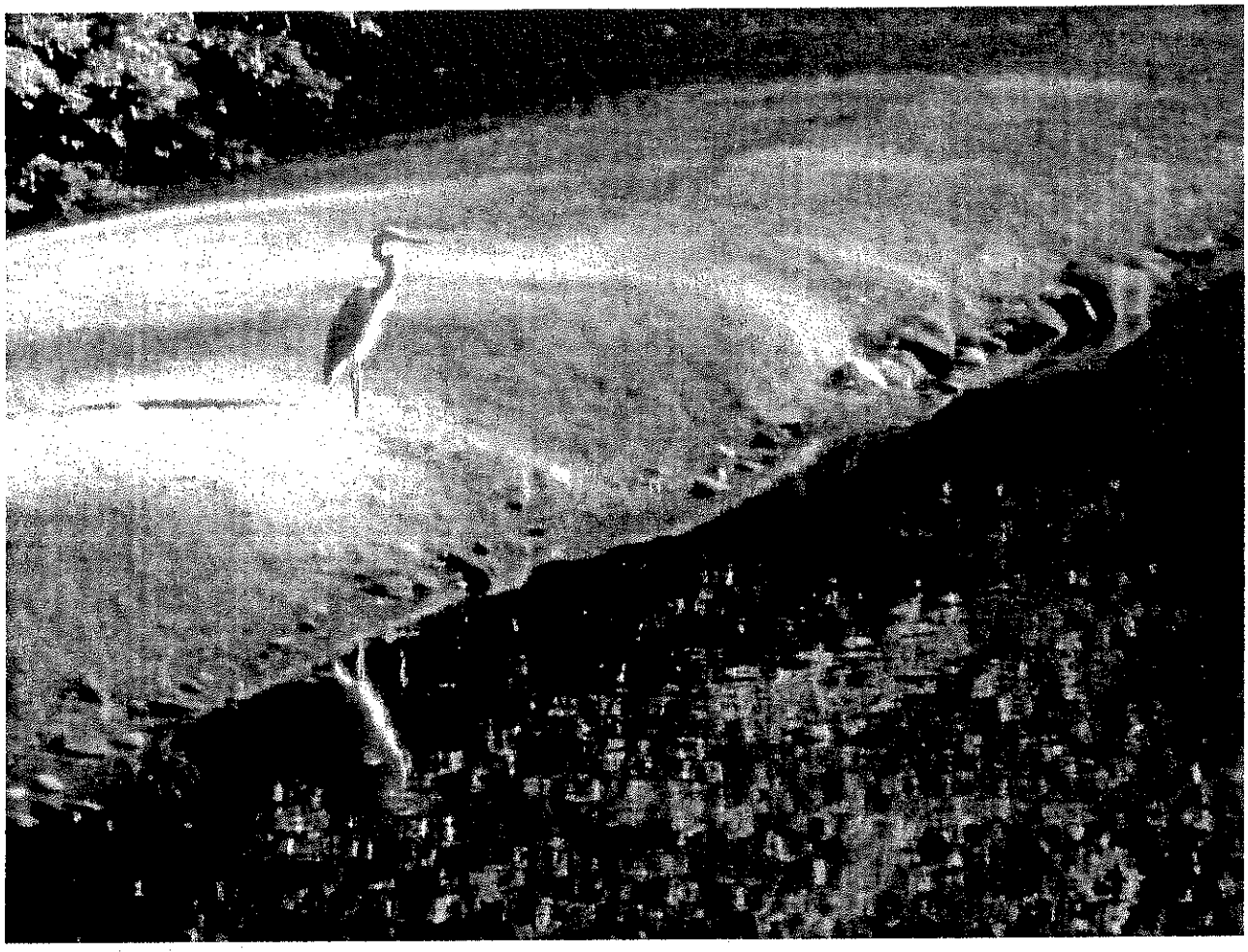
HART EXHIBIT B



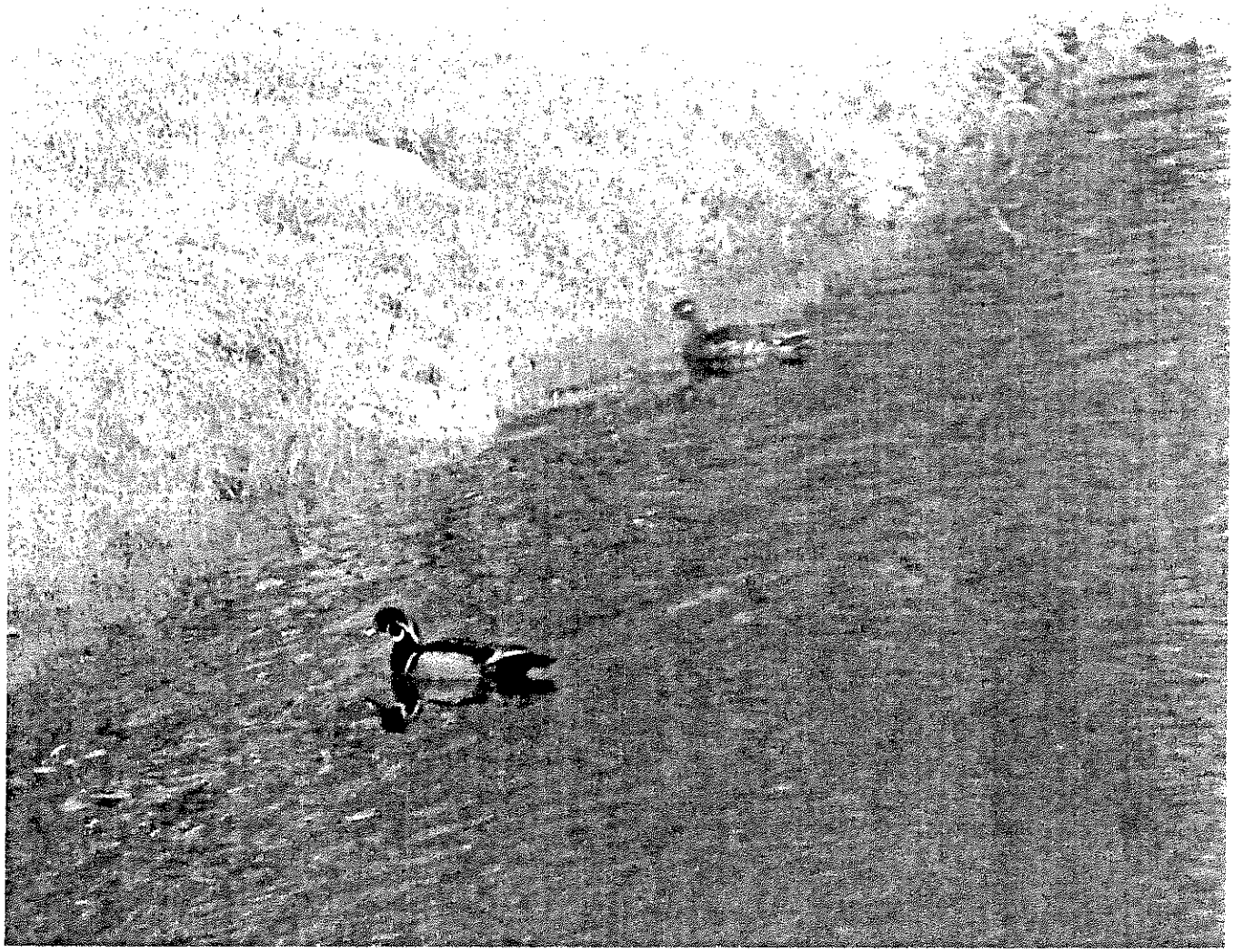
HART EXHIBIT C(1)



HART EXHIBIT C(2)



HART EXHIBIT D



HART EXHIBIT E

HART EXHIBIT F

HART EXHIBIT G

BIRDS PROTECTED BY THE MIGRATORY BIRD TREATY ACT

List of Migratory Birds

This is an adaptation of the List of Migratory Birds that appears in Title 50 of the Code of Federal Regulations, Section 10.13. The major difference between this list and the "official" published list is that the scientific and common (English) names have been changed to conform to the most recent taxonomy (as reflected in the 1983 AOU Check-list and published supplements through 1995). In cases where a name in the following list differs from that in the CFR list, the name in the CFR list is cross-referenced in parentheses. EXAMPLES: in the CFR list, the Yellow Bittern is listed as Chinese Bittern and the scientific name of the Crested Caracara (Caracara plancus) is given as Polyborus plancus. The referenced species are the same in both lists, only the nomenclature has changed.

Alphabetical List

Taxonomic List

Alphabetical List

[A] [B] [C] [D] [E] [F] [G] [H] [I]
[J] [K] [L] [M] [N] [O] [P] [Q] [R] [S] [T] [U] [V] [W] [X] [Y] [Z]

Accentor, Siberian, Prunella montanella
Albatross, Black-footed, Diomedea nigripes
Laysan, Diomedea immutabilis
Short-tailed, Diomedea albatrus
Yellow-nosed, Diomedea chlororhynchos
Anhinga, Anhinga anhinga
Ani, Groove-billed, Crotophaga sulcirostris
Smooth-billed, Crotophaga ani
Auklet, Cassin's, Ptychoramphus aleuticus
Crested, Aethia cristatella
Least, Aethia pusilla
Parakeet, Cyclorrhynchus psittaculus
Rhinoceros, Cerorhinca monocerata
Whiskered, Aethia pygmaea
Avocet, American, Recurvirostra americana

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Barn-Owl, Common (see Owl, Barn)
Beardless-Tyrannulet, Northern, Camptostoma imberbe
Becard, Rose-throated, Pachyramphus aglaiae
Bittern, American, Botaurus lentiginosus
Chinese (see Bittern, Yellow)

Least, Ixobrychus exilis
Yellow (=Chinese), Ixobrychus sinensis
Schrenk's, Ixobrychus eurhythmus
Black-Hawk, Common, Buteogallus anthracinus
Blackbird, Brewer's, Euphagus cyanocephalus
Red-winged, Agelaius phoeniceus
Rusty, Euphagus carolinus
Tawny-shouldered, Agelaius humeralis
Tricolored, Agelaius tricolor
Yellow-headed, Xanthocephalus xanthocephalus
Yellow-shouldered, Agelaius xanthomus
Bluebird, Eastern, Sialia sialis
Mountain, Sialia currucoides
Western, Sialia mexicana
Bluethroat, Luscinia svecica
Bobolink, Dolichonyx oryzivorus
Booby, Blue-footed, Sula nebouxii
Brown, Sula leucogaster
Masked, Sula dactylatra
Red-footed, Sula sula
Brambling, Fringilla montifringilla
Brant, Branta bernicla
Bufflehead, Bucephala albeola
Bullfinch, Eurasian, Pyrrhula pyrrhula
Puerto Rican, Loxigilla portoricensis
Bunting, Indigo, Passerina cyanea
Lark, Calamospiza melanocorys
Lazuli, Passerina amoena
McKay's, Plectrophenax hyperboreus
Painted, Passerina ciris
Pallas' (=Reed-bunting, Pallas'), Emberiza pallasi
Reed, (=Reed-Bunting, Common), Emberiza schoeniculus
Rustic, Emberiza rustica
Snow, Plectrophenax nivalis
Varied, Passerina versicolor
Bushtit, Psaltriparus minimus

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Canvasback, Aythya valisneria
Caracara, Crested, Caracara (=Polyborus) plancus
Cardinal, Northern, Cardinalis cardinalis
Carib, Green-throated, Eulampis holosericeus
Catbird, Gray, Dumetella carolinensis
Chat, Yellow-breasted, Icteria virens
Chickadee, Black-capped, Parus atricapillus
Boreal, Parus hudsonicus
Carolina, Parus carolinensis
Chestnut-backed, Parus rufescens
Mexican, Parus sclateri
Mountain, Parus gambeli
Chuck-will's-widow, Caprimulgus carolinensis
Condor, California, Gymnogyps californianus
Coot, American, Fulica americana
Caribbean, Fulica caribaea
Eurasian, Fulica atra
Hawaiian (=American), Fulica alai (=americana)
Cormorant, Brandt's, Phalacrocorax penicillatus
Double-crested, Phalacrocorax auritus
Great, Phalacrocorax carbo
Neotropic (=Olivaceous), Phalacrocorax brasilianus (=olivaceus)
Olivaceus (see Cormorant, Neotropic)
Pelagic, Phalacrocorax pelagicus

Red-faced, Phalacrocorax urile
/bird, Bronzed, Molothrus aeneus
Brown-headed, Molothrus ater
Shiny, Molothrus bonariensis
Crake, Corn, Crex crex
Yellow-breasted, Porzana flaviventer
Crane, Common, Grus grus
Sandhill, Grus canadensis
Whooping, Grus americana
Creeper, Brown, Certhia americana
Crossbill, Red, Loxia curvirostra
White-winged, Loxia leucoptera
Crow, American, Corvus brachyrhynchos
Fish, Corvus ossifragus
Hawaiian, Corvus hawaiiensis
Mexican, Corvus imparatus
Northwestern, Corvus caurinus
White-necked, Corvus leucognaphalus
Cuckoo, Black-billed, Coccyzus erythropthalmus
Common, Cuculus canorus
Mangrove, Coccyzus minor
Oriental, Cuculus saturatus
Yellow-billed, Coccyzus americanus
Curlew, Bristle-thighed, Numenius tahitiensis
Eskimo, Numenius borealis
Far Eastern, Numenius madagascariensis
Least (see Curlew, Little)
Little (=Least), Numenius minutus
Long-billed, Numenius americanus

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Dickcissel, Spiza americana
Dipper, American, Cinclus mexicanus
Dotterel, Eurasian, Charadrius morinellus
Dove, Inca, Columbina inca
Mourning, Zenaida macroura
White-tipped, Leptotila verreauxi
White-winged, Zenaida asiatica
Zenaida, Zenaida aurita
Dovekie, Alle alle
Dowitcher, Long-billed, Limnodromus scolopaceus
Short-billed, Limnodromus griseus
Duck, American Black, Anas rubripes
Harlequin, Histrionicus histrionicus
Hawaiian, Anas wyvilliana
Laysan, Anas laysanensis
Masked, Oxyura dominica
Mottled, Anas fulvigula
Ring-necked, Aythya collaris
Ruddy, Oxyura jamaicensis
Tufted, Aythya fuligula
Wood, Aix sponsa
Dunlin, Calidris alpina

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Eagle, Bald, Haliaeetus leucocephalus
Golden, Aquila chrysaetos
White-tailed, Haliaeetus albicilla
Egret, Cattle, Bubulcus ibis
Chinese, Egretta eulophotes
Great, Ardea (=Casmerodius) alba (=albus)
Intermediate (=Plumed), Mesophoyx (=Egretta) intermedia

Plumed (see Egret, Intermediate)
Reddish, Egretta rufescens
Snowy, Egretta thula
der, Common, Somateria mollissima
King, Somateria spectabilis
Spectacled, Somateria fischeri
Steller's, Polysticta stelleri
Elaenia, Caribbean, Elaenia martinica
Emerald, Puerto Rican, Chlorostilbon maugaeus
Euphonia, Antillean, Euphonia musica

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Falcon, Aplomado, Falco femoralis
Peregrine, Falco peregrinus
Prairie, Falco mexicanus
Fieldfare, Turdus pilaris
Finch, Cassin's, Carpodacus cassinii
House, Carpodacus mexicanus
Purple, Carpodacus purpureus
Rosy (see Rosy-Finch, Black; Rosy-Finch, Brown-capped; and Rosy-Finch, Gray-crowned)
Flamingo, Greater, Phoenicopterus ruber
Flicker, Gilded (=Northern), Colaptes chrysoides (=auratus)
Northern, Colaptes auratus
Flycatcher, Acadian, Empidonax virescens
Alder, Empidonax alnorum
Ash-throated, Myiarchus cinerascens
Brown-crested, Myiarchus tyrannulus
Buff-breasted, Empidonax fulvifrons
Cordilleran (=Western), Empidonax occidentalis (=difficilis)
Dusky, Empidonax oberholseri
Dusky-capped, Myiarchus tuberculifer
Fork-tailed, Tyrannus savana
Gray, Empidonax wrightii
Gray-spotted, Muscicapa griseisticta
Great Crested, Myiarchus crinitus
Hammond's, Empidonax hammondii
Least, Empidonax minimus
Narcissus, Muscicapa narcissina
Nutting's, Myiarchus nuttingi
Olive-sided, Contopus borealis
Pacific-slope (=Western), Empidonax difficilis
Puerto Rican, Myiarchus antillarum
Scissor-tailed, Tyrannus forficatus
Sulphur-bellied, Myiodynastes luteiventris
Vermilion, Pyrocephalus rubinus
Western (see Flycatcher, Cordilleran; and Flycatcher, Pacific-slope)
Willow, Empidonax traillii
Yellow-bellied, Empidonax flaviventris
Frigatebird, Great, Fregata minor
Lesser, Fregata ariel
Magnificent, Fregata magnificens
Fulmar, Northern, Fulmarus glacialis

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Gadwall, Anas strepera
Gallinule, Purple, Porphyrula martinica
Gannet (see Gannet, Northern)
Northern (=Gannet), Morus (=Sula) bassanus
Garganey, Anas querquedula
Gnatcatcher, Black-capped, Polioptila nigriceps
Black-tailed, Polioptila melanura

Blue-gray, Polioptila caerulea
California (=Black-tailed), Polioptila californica (=melanura)
dwit, Bar-tailed, Limosa lapponica
Black-tailed, Limosa limosa
Hudsonian, Limosa haemastica
Marbled, Limosa fedoa
Golden-Plover, American (=Lesser), Pluvialis dominicus (=dominica)
Lesser (see Golden-Plover, American; and Golden-Plover, Pacific)
Pacific (=Lesser), Pluvialis fulva (=dominica)
Goldeneye, Barrow's, Bucephala islandica
Common, Bucephala clangula
Goldfinch, American, Carduelis tristis
Lawrence's, Carduelis lawrencei
Lesser, Carduelis psaltria
Goose, Barnacle, Branta leucopsis
Bean, Anser fabalis
Canada, Branta canadensis
Emperor, Chen canagica
Greater White-fronted, Anser albifrons
Hawaiian, Branta (=Nesochen) sandvicensisRoss', Chen rossii
Snow, Chen caerulescens
Goshawk, Northern, Accipiter gentilis
Grackle, Boat-tailed, Quiscalus major
Common, Quiscalus quiscula
Great-tailed, Quiscalus mexicanus
Greater Antillean, Quiscalus niger
Grasshopper-Warbler, Middendorff's, Locustella ochotensis
Grassquit, Black-faced, Tiaris bicolor
Yellow-faced, Tiaris olivacea
Grebe, Clark's (=Western), Aechmophorus clarkii (=occidentalis)
Eared, Podiceps nigricollis
Horned, Podiceps auritus
Least, Tachybaptus dominicus
Pied-billed, Podilymbus podiceps
Red-necked, Podiceps grisegena
Western, Aechmophorus occidentallis
Greenfinch, Oriental, Carduelis sinica
Greenshank, Common, Tringa nebularia
Grosbeak, Black-headed, Pheucticus malanocephalus
Blue, Guiraca caerulea
Crimson-collard, Rhodothraupis celaeno
Evening, Coccothraustes vespertinus
Pine, Pinicola enucleator
Rose-breasted, Pheucticus ludovicianus
Yellow, Pheucticus chrysopeplus
Ground-Dove, Common, Zenaida passerina
Ruddy, Zenaida talpacoti
Guillemot, Black, Cepphus grylle
Pigeon, Cepphus columba
Gull, Black-headed (=Common Black-headed), Larus ridibundus
Bonaparte's, Larus philadelphia
California, Larus californicus
Common Black-headed (see Gull, Black-headed)
Franklin's, Larus pipixcan
Glaucous, Larus hyperboreus
Glaucous-winged, Larus glaucescens
Great Black-backed, Larus marinus
Heermann's, Larus heermanni
Herring, Larus argentatus
Iceland, Larus glaucoides
Ivory, Pagophila eburnea
Laughing, Larus atricilla
Lesser Black-headed, Larus fuscus
Little, Larus minutus
Mew, Larus canus

Ring-billed, Larus delawarensis
Ross', Rhodostethia rosea
Sabine's, Xema sabini
Slaty-backed, Larus schistisagus
Thayer's, Larus thayeri
Western, Larus occidentalis
Yellow-footed, Larus livens
Gyrfalcon, Falco rusticolus

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Harrier, Northern, Circus cyaneus
Hawfinch, Coccothraustes coccothraustes
Hawk, Asiatic Sparrow, Accipiter gularis
Broad-winged, Buteo platypterus
Cooper's, Accipiter cooperii
Ferruginous, Buteo regalis
Gray, Buteo nitidus
Harris', Parabuteo unicinctus
Hawaiian, Buteo solitarius
Red-shouldered, Buteo lineatus
Red-tailed, Buteo jamaicensis
Rough-legged, Buteo lagopus
Sharp-shinned, Accipiter striatus
Short-tailed, Buteo brachyurus
Swainson's, Buteo swainsoni
White-tailed, Buteo albicaudatus
Zone-tailed, Buteo albonotatus
Hawk-Cuckoo, Hodgson's, Cuculus fugax
Hawk-Owl, Northern (see Owl, Hawk)
Heron, Great Blue, Ardea herodias
Green (=Green-backed), Butorides virescens (=striatus)
Green-backed (see Heron, Green)
Little Blue, Ardea caerulea
Night (see Night-Heron)
Pacific Reef, Ardea sacra
Tricolored, Ardea tricolor
Hoopoe, Upupa epops
House-Martin, Common, Delichon urbica
Hummingbird, Allen's, Selasphorus sasin
Anna's, Calypte anna
Antillean Crested, Orthorhynchus cristatus
Berylline, Amazilia beryllina
Black-chinned, Archilochus alexandri
Blue-throated, Lampornis clemenciae
Broad-billed, Cynanthus latirostris
Broad-tailed, Selasphorus platycercus
Buff-bellied, Amazilia yucatanensis
Calliope, Stellula calliope
Costa's, Calypte costae
Lucifer, Calothorax lucifer
Magnificent, Eugenes fulgens
Ruby-throated, Archilochus colubris
Rufous, Selasphorus rufus
Violet-crowned, Amazilia violiceps
White-eared, Hylocharis leucotis

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Ibis, Glossy, Plegadis falcinellus
Scarlet, Eudocimus ruber
White, Eudocimus albus
White-faced, Plegadis chihi

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Jabiru, Jabiru mycteria
Jacana, Northern, Jacana spinosa
Jaeger, Long-tailed, Stercorarius longicaudus
Parasitic, Stercorarius parasiticus
Pomarine, Stercorarius pomarinus
Jay, Blue, Cyanocitta cristata
Brown, Cyanocorax morio
Gray, Perisoreus canadensis
Gray-Breasted (see Jay, Mexican)
Green, Cyanocorax yncas
Mexican (=Gray-breasted), Aphelocoma ultramarina
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04/09/2009

Cottontails in Morris Have State Grooming the Landscape

By: Daniela Forte

MORRIS-The state is making a stand on behalf of the native bunnies that are clinging to a dwindling habitat in one of Connecticut's newest and least known state forests.

Wildlife biologists from the state Department of Environmental Protection (DEP) are conducting a study at Camp Columbia State Forest in Morris known as the New England Cottontail Habitat Enhancement Project.

"The native species [of cottontails] are declining in distribution and in numbers," said Howard Kilpatrick, a DEP wildlife biologist. "The New England cottontail is basically limited to most of New England and a small portion of New York."

According to Mr. Kilpatrick, the enhancement project is designed to yield important information about the distribution and ecological preferences of New England cottontails-a native species that is distinct from the Eastern cottontail, which was introduced to the Northeast.

The New England cottontail ranges between western New England to the Hudson River and south down to the Appalachian Mountains. The Eastern cottontail can be found in the eastern United States and southern Canada, and its range extends south to eastern Mexico and into Central America, with another population in Texas, New Mexico and Arizona.

But both the numbers and range of New England cottontails appear to be decreasing, and Mr. Kilpatrick said the U.S. Fish and Wildlife Service is considering the possibility of naming the rabbits an endangered species.

"The more information we can learn, the better," said Mr. Kilpatrick.

In doing the distribution work, wildlife biologists have identified Camp Columbia-a 600-acre state forest and park that was once owned by Columbia University and used for summer engineering and other programs-as a location that is inhabited by New England and Eastern cottontails.

These species can be found together in four locations, including a private farm in Kent, a state forest in North Stonington and a private farm in Scotland, in Eastern Connecticut.

"We have been capturing both Eastern and New England cottontails at these sites, putting radio transmitters on them, learning information about movement, habitat and survival," said Mr. Kilpatrick.

Mr. Kilpatrick said Connecticut supports the largest percentage of New England cottontails found in New England states.

According to the DEP's Web site, the Eastern cottontail was introduced into New England in the late 1800s and early 1900s and has expanded its range, outcompeting the New England cottontails for habitat.

In the mid-1930s, New England cottontails were still considered abundant and more numerous than the Eastern cottontail.

"It's a species we are interested in and we want to better manager for that species," said Mr. Kilpatrick of the native species.

The cottontail rabbit is a somewhat stocky animal with large hind feet, long ears and a short fluffy tail that resembles a cotton ball. The cottontails' long coarse coat varies in color from reddish-brown to a black or grayish-brown. The rabbits under parts are white. The New England and Eastern cottontails are almost identical in appearance except for a slight variation in color. The difference between the two species is that half of the Eastern cottontail population shows white, star-like shapes on the forehead, while New England cottontails do not.

According to Peter Picone, a wildlife biologist for the Habitat Management Program of DEP, what is unique about the Morris project is that he, along with other wildlife biologists, are creating the type of habitat preferred by New England cottontails, which is basically a brush and shrub environment.

"As the forests mature, that kind of habitat is less common, [partly] because Connecticut forests have grown up around the turn of the century, around the farm abandonment period (1900s). The New England cottontail is still hanging on in that habitat," said Mr. Picone.

Mr. Picone explained that DEP staff removed a patch of vegetation known as "pole timber," which is basically less than nine inches in trees. The team hired someone with a whole tree harvester and had all the trees cut and stacked in piles on the property.

The habitat will begin as stumps and evolve into a thick dense young habitat for the rabbits.

Mr. Picone said he and Mr. Kilpatrick will then document the status of area before the habitat improvement and monitor it afterward.

Camp Columbia is one of Connecticut's most recent land acquisitions. It is located not far from Bantam Lake and extends from behind the residential properties on the South side of Route 109 into Bethlehem. The 600-acre property was acquired from Columbia University in 2000 and dedicated in 2004. According to the DEP Web site, Camp Columbia was once used as a summer camp by the university's surveying and engineering students.

For more information on the New England and Eastern cottontails, visit www.ct.gov/dep/.

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04/03/2008

Bats in the Region Are Dying From a Mysterious Ailment

By: Kathryn Boughton

Alarm spread among wildlife biologists this week when white nose syndrome (WNS) was found in a second bat population in Connecticut. The state Department of Environmental Protection (DEP) first announced the presence in Connecticut of bats affected with WNS last Friday and the second location was discovered Tuesday. WNS is a fungus connected with the death of large numbers of bats in New York, Massachusetts and Vermont.

Bat populations are being closely monitored by other states along the East Coast for the spread of WNS, which has wiped out 80 to 90 percent of the bats from affected hibernaculas in New York, where it was first reported two years ago. The affected species in Connecticut are the little brown bat (Myotis lucifugus) and northern long-eared (Myotis septentrionalis). Both are fairly common and found statewide.

Jenny Dickson, supervising wildlife biologist with the DEP, declined to say where the bats were found. "Typically we don't list sites," she said, "because they are often on private property and because we want to ensure that the bats are protected. But there are several hibernaculas (areas where bats hibernate) scattered around Litchfield County."

"The presence of WNS could have a major impact on biodiversity in Connecticut, and we are taking this discovery very seriously," she continued. "Bats are our single largest predator of night flying insects and provide an important form of natural insect control. Any significant depletion in their numbers will also result in a significant effect in other parts of our ecosystem."

Dr. R. Laurence Davis, professor of earth and environmental sciences at the University of New Haven, explained further. "Bats will eat 4,000 to 7,000 mosquitoes each night, per bat. Those mosquitoes won't be eaten if the bats die. Mosquitoes have a major impact on the environment, carrying diseases such as West Nile Fever. Bats also eat moths-you could say that's just a few more moths around the light at night, but adult moths make baby moths and those are caterpillars that defoliate things. We have the potential for-I am trying not to use the word 'disaster' ... .'

He said the impact will be exacerbated because bats are long lived-up to 30 years-and have a low birth rate. "Typically, they have only one pup a year," the professor said, "It's not like it's a population of mice that crashed, where they have three and four litters a year-you would have mice again in a hurry-but bats are going to take a long time to come back. Normally, you would expect bats from other colonies to come in and scarf up the bugs-no food source goes wasted-but with 80 to 90 percent of the New York bats dying off, you are beginning to test the limits of bat migration."

Bat migration is of interest from another point of view as well. Ms. Dickson said it is as yet unknown whether the fungus is being transmitted environmentally or bat to bat. Because bats tend to migrate before hibernation, Connecticut bats could be bringing the fungus back with them from winter hibernaculas, or not returning at all.

"Our summer population of bats is very large," she said, "but we have many more in summer than in winter because Connecticut does not have a lot of ideal hibernaculas. They could be bringing it back or traveling there and not surviving."

Part of the problem facing those fighting to stop the decimation of the bat population is the uncertainty about what is happening. Ms. Dickson said biological data is being gathered and assessed to try to determine what is killing the bats. There is a strong suspicion that the white fungus that appears on the face and other parts of the bats is a symptom and not a cause of their death. Because there is no known cause of death at this time, no attempt is being made to euthanize infected populations.

"When you are taking 80 percent losses you are talking about these critters being decimated," she said. "You don't want to kill off those that have it because some of them might survive and might be able to develop a resistance. Scientists are now trying to get to the root cause of what is happening so we can make management decisions."

She added, "There is a fair amount of finger-crossing going on."

To date, the prevalence of WNS is not severe in Connecticut. "But we saw it in New York at low levels last year," she conceded.

This year, biologists are seeing the white fungus on bats hibernating in New York, southwest Vermont, western Massachusetts, and now Connecticut and the search is on elsewhere as well. "They are not finding it in other places yet, but there sure is a lookout," said Professor Davis. "Another huge area for hibernaculas is West Virginia and Virginia. West Virginia has already listed precautions and stopped caving."

Dr. Davis, science coordinator for the Northeastern Cave Conservancy, said that group and the National Speleological Society have closed their caves at least through the hibernation period. "Then we will make another judgment," he said.

He explained, "Nobody knows what is causing the problem, but we know what they are dying from-they're dying from starvation and dehydration. They are coming out, flying around, looking for food and water, and there is none. But what is waking them up? The fungus? Something else? We've pretty well confirmed that the fungus is secondary."

He said that hibernation is dicey for bats under the best of circumstances because they are so small. "The smaller you are, the higher your body temperature," he explained. "For bats to make it through the winter they really turn down their metabolism. They might have only a few heart beats in a minute. If they wake up though, they spin right back up to their normal metabolism, and they are really on the border for making it through the winter. They depend on insects for food and there won't be many of them for at least a couple of weeks."

"One of the mysteries that is frustrating biologists is why the bats are suffering this extreme dehydration and weight loss," said Ms. Dickson. "If they had normal body weight [and hydration] could they fight off the fungus? Since a lot of other things seem fairly normal, if they can hang on a few weeks and get out and feed, they might be able to survive."

Dr. Davis said that there is little data available on bats, which is making it difficult for scientists to determine cause and effect. "They don't normally do bat surveys every year in every cave," he said, "mainly because when you go in, you wake them up and they burn up fat with noting to eat. This syndrome could have started earlier than two years ago-we just don't know. The real problem is there are no in-depth studies of bat biology. There are several labs working as hard as they can and they find parasites, they find bacteria on the fur or skin-but no one knows if this is normal because there is no data on a healthy population. We haven't found any toxins; we haven't found any smoking gun. Everything is so inter-connected. There are so many different elements that could be attributed to something else. No one

knows for sure."
The DEP will continue to work with the U.S. Fish and Wildlife Service (USFWS) and other states throughout the region to monitor the bat population for the presence of WNS.
Anyone observing large numbers of dead bats or bats out in the day over the next few weeks while bats should still be hibernating should contact the DEP by calling 860-675-8130.
Additional information on WNS is available at http://www.fws.gov/northeast/white_nose.html.

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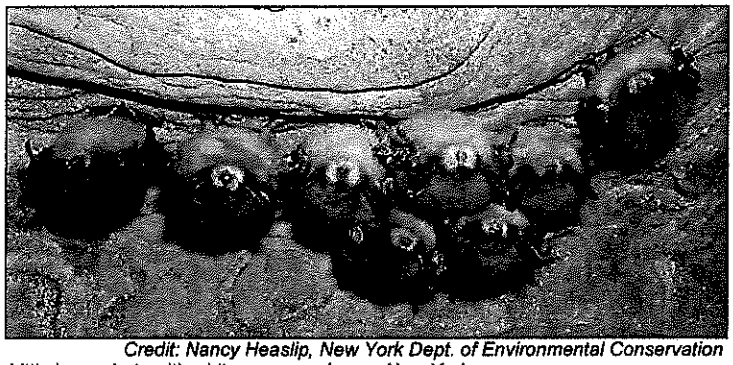
EXHIBIT CR 14

Northeast Region

Conserving the Nature of America

Sunday,
April 12, 2009

White-Nose Syndrome in bats: Something is killing our bats

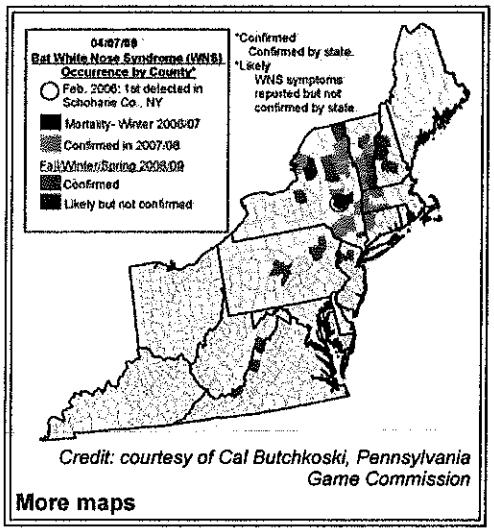


Credit: Nancy Heaslip, New York Dept. of Environmental Conservation
Little brown bats with white-nose syndrome, New York

Cave advisory: Service recommends suspending activities in caves to protect bats from white-nose syndrome

FAQs

News release



Credit: courtesy of Cal Butchkoski, Pennsylvania Game Commission

More maps

In February 2006 some 40 miles west of Albany, N.Y., a caver photographed hibernating bats with an unusual white substance on their muzzles. He noticed several dead bats. The following winter, bats behaving erratically, bats with white noses and a few hundred dead bats in several caves came to the attention of New York Department of Environmental Conservation biologists, who documented white-nose syndrome in January 2007. Hundreds of thousands of hibernating bats have died since. Biologists with state and federal agencies and organizations across the country are still trying to find the answer to this deadly mystery.

We have found sick, dying and dead bats in unprecedented numbers in and around caves and mines from Vermont to Virginia. In some hibernaculum, 90 to 100 percent of the bats are dying.

While they are in the hibernaculum, affected bats often have white

fungus on their muzzles and other parts of their bodies. They may have

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low body fat. These bats often move to cold parts of the hibernacula, fly during the day and during cold winter weather when the insects they feed upon are not available, and exhibit other uncharacteristic behavior.

Despite the continuing search to find the source of this condition by numerous laboratories and state and federal biologists, the cause of the bat deaths remains unknown. Recent identification of a **cold-loving fungus** could be a step toward an answer.

State and Service biologists are:

- Writing proposals to secure funding for monitoring and research.
- Responding to news media and public inquiries about WNS and the March 26, 2009, cave advisory.
- Coordinating Task Groups addressing various aspects of the investigation and management of WNS work.
- Surveying additional caves/mines to track known WNS-affected sites and identify additional sites.
- Revisiting current protocols to ensure we have the most up-to-date recommendations.
- Holding regular conference calls to discuss WNS monitoring, research and management.
- Developing contracts with researchers to investigate WNS (Service activity).

April 3, 2009 **Previous activities archived**

Last updated: April 7, 2009

BIRDS PROTECTED BY THE MIGRATORY BIRD TREATY ACT

Species Protected by Each Migratory Bird Convention

The United States has entered into four international migratory bird conventions (with Canada, Mexico, Japan, and Russia). Each of these conventions provides protection to a select group of species. The Canadian convention identifies protected groups by Family or species group names (for example, Anatidae, Rallidae, loons, warblers, and so forth). The Mexican convention identifies protected groups by Family names. The Japanese and Russian conventions identify protected species in Appendices to the conventions.

The following list identifies those species protected by each of the conventions.

Column headings:
- C = Canadian
- M = Mexican
- J = Japanese
- R = Russian

Symbols:
- O = Family (or Subfamily) listed in convention (Canada and Mexico only)
- s = occurs regularly in both countries (Canada and Mexico only);
- + = occurs regularly in the U.S. but not Canada or Mexico (Canada and Mexico only);
- ? = status in U.S. is uncertain, and eligibility for continued protection is under review (Mexico only)
- X = listed in Appendix to convention (Japan and Russia only);
- o = belongs to same Family as species listed in Appendix to convention and occurs regularly in the U.S. (Russia only)

English Name	C	M	J	R
GAVIIDAE (Loons)	O	O		
Red-throated Loon	s	s	X	X
Arctic Loon	s	+	X	X
Pacific (=Arctic) Loon	s			X
Common Loon	s	s		o
Yellow-billed Loon	s	s	X	X
PODICIPEDIDAE (Grebes)	O	O		
Least Grebe	+	s		o
Pied-billed Grebe	s	s		o
Horned Grebe	s	s	X	X
Red-necked Grebe	s	+	X	X
Eared Grebe	s	s		o

Western Grebe	s	s		o
Clark's (=Western) Grebe	s	s		o
DIOMEDEIDAE (Albatrosses)		O		
Short-tailed Albatross		s	X	X
Black-footed Albatross		s	X	X
Laysan Albatross		s	X	X
Yellow-nosed Albatross		+		o
PROCELLARIIDAE (Shearwaters and Petrels)	O	O		
Northern Fulmar	s	s	X	X
Black-capped Petrel	s	+		o
Dark-rumped Petrel	+	s		o
Juan Fernandez (=White-necked) Petrel	+	s		o
White-necked Petrel	+	+		o
Mottled Petrel	s	+		X
Murphy's Petrel	+	+		o
Kermadec Petrel	+	s		o
Herald Petrel	+	s		o
Cook's Petrel	+	s		o
Bonin Petrel	+	+	X	X
Bulwer's Petrel	+	+	X	o
Cory's Shearwater	s	s		o
Pink-footed Shearwater	s	s		o
Flesh-footed Shearwater	s	s	X	X
Greater Shearwater	s	s		o
Wedge-tailed Shearwater	+	s	X	o
Buller's Shearwater	s	s		X
Sooty Shearwater	s	s	X	X
Short-tailed Shearwater	s	s	X	X
Christmas Shearwater	+	s	X	o
Manx Shearwater	s	+		o
Black-vented Shearwater	s	s		o
Townsend's Shearwater	+	s		o
Little Shearwater	s	+		o
Audubon's Shearwater	s	s		o
HYDROBATIDAE (Storm-Petrels)	O	O		
Wilson's Storm-Petrel	s	+	X	o
White-faced Storm-Petrel	+	+		o
Fork-tailed Storm-Petrel	s	+	X	X
Leach's Storm-Petrel	s	s	X	X
Ashy Storm-Petrel	+	s		o
Band-rumped Storm-Petrel	s	s	X	X
Wedge-rumped Storm-Petrel	+	s		o
Black Storm-Petrel	+	s		o
Tristram's (=Sooty) Storm-Petrel	+	+	X	o
Least Storm-Petrel	+	s		o

PHAETHONTIDAE (Tropicbirds)		O		
White-tailed Tropicbird		s	X	
Red-billed Tropicbird		s		
Red-tailed Tropicbird		s	X	
SULIDAE (Boobies and Gannets)	O	O		
Masked Booby	+	s	X	
Blue-footed Booby	+	s		
Brown Booby	+	s	X	
Red-footed Booby	+	s	X	
Northern Gannet (=Gannet)	s	+		
PELECANIDAE (Pelicans)		O		
American White Pelican		s		
Brown Pelican		s		
PHALACROCORACIDAE (Cormorants)		O		
Great Cormorant		+		o
Double-crested Cormorant		s		o
Neotropic (=Olivaceous) Cormorant		s		o
Brandt's Cormorant		s		o
Pelagic Cormorant		s	X	X
Red-faced Cormorant		+	X	X
ANHINGIDAE (Anhingas)		O		
Anhinga		s		
FREGATIDAE (Frigatebirds)		O		
Great Frigatebird		s	X	
Magnificent Frigatebird		s		
Lesser Frigatebird		+	X	
ARDEIDAE (Bitterns and Herons)	O	O		
American Bittern	s	s		o
Least Bittern	s	s		o
Yellow (=Chinese) Bittern			X	X
Schrenk's Bittern			X	X
Great Blue Heron	s	s		o
Great Egret	s	s		o
Intermediate (=Plumed) Egret			X	X
Chinese Egret				X
Pacific Reef Heron			X	
Snowy Egret	s	s		o
Little Blue Heron	s	s		o
Tricolored Heron	s	s		o
Reddish Egret	s	s		o
Cattle Egret	s	s	X	o
Green (=Green-backed) Heron	s	s		o
Black-crowned Night-Heron	s	s		o
Malay Night-Heron			X	o

Japanese Night-Heron			X	o
Yellow-crowned Night-Heron	s	s		o
Family THRESKIORNITHIDAE (Ibises and Spoonbills)		O		
White Ibis		s		
Scarlet Ibis		?		
Glossy Ibis		s		
White-faced Ibis		s		
Roseate Spoonbill		s		
Family CICONIIDAE (Storks)		O		
Jabiru		s		
Wood Stork		s		
Family PHOENICOPTERIDAE (Flamingos)		O		
Greater Flamingo		s		
Family ANATIDAE (Swans, Geese, and Ducks)	O	O		
Fulvous Whistling-Duck	s	s		o
Black-bellied Whistling-Duck	s	s		o
West Indian Whistling-Duck	+	+		o
Tundra Swan	s	s		X
Whooper Swan	+	+	X	X
Trumpeter Swan	s	s		o
Bean Goose	s	+	X	X
Greater White-fronted Goose	s	s	X	X
Snow Goose	s	s	X	X
Ross' Goose	s	s		o
Emperor Goose	s	+	X	X
Brant	s	s	X	X
Barnacle Goose	s	+		o
Canada Goose	s	s	X	X
Hawaiian Goose	+	+		o
Wood Duck	s	s		o
Green-winged Teal	s	s	X	X
Baikal Teal	s	+	X	X
Falcated Teal	s	+	X	X
American Black Duck	s	+		o
Mottled Duck	+	s		o
Mallard	s	s	X	X
Hawaiian Duck	+	+		o
Laysan Duck	+	+		o
White-cheeked Pintail	+	+		o
Northern Pintail	s	s	X	X
Garganey	s	+	X	X
Blue-winged Teal	s	s		o
Cinnamon Teal	s	s		o
Northern Shoveler	s	s	X	X

Gadwall	s	s	X	o
Eurasian Wigeon	s	s	X	X
American Wigeon	s	s	X	X
Common Pochard	+	+	X	X
Canvasback	s	s	X	o
Redhead	s	s		o
Baer's Pochard			X	
Ring-necked Duck	s	s		o
Tufted Duck	s	+	X	X
Greater Scaup	s	s		X
Lesser Scaup	s	s		o
Common Eider	s	+		X
King Eider	s	+		X
Spectacled Eider	s	+		X
Steller's Eider	s	+	X	X
Harlequin Duck	s	s	X	X
Oldsquaw	s	s	X	X
Black Scoter	s	s	X	X
Surf Scoter	s	s		X
White-winged Scoter	s	s	X	o
Common Goldeneye	s	s	X	X
Barrow's Goldeneye	s	+		o
Bufflehead	s	s	X	X
Smew	s	+	X	X
Hooded Merganser	s	s		o
Common Merganser	s	s	X	X
Red-breasted Merganser	s	s	X	X
Ruddy Duck	s	s		o
Masked Duck	+	s		o
CATHARTIDAE (American Vultures)		O		
Black Vulture		s		
Turkey Vulture		s		
California Condor		s		
ACCIPITRIDAE (Kites, Eagles, Hawks, and Allies)		O		
Osprey		s	X	X
Hook-billed Kite		s		o
Swallow-tailed (=American Swallow-tailed) Kite		s		o
White-tailed (=Black-shouldered) Kite		s		o
Snail Kite		s		o
Mississippi Kite		s		o
Black Kite			X	X
Bald Eagle		s		X
White-tailed Eagle		+	X	X
Steller's Sea-Eagle		+	X	X
Northern Harrier		s		X
Asiatic Sparrow Hawk			X	X

Sharp-shinned Hawk		s		o
Cooper's Hawk		s		o
Northern Goshawk		s		o
Common Black-Hawk		s		o
Harris' Hawk		s		o
Gray Hawk		s		o
Red-shouldered Hawk		s		o
Broad-winged Hawk		s		o
Short-tailed Hawk		s		o
Swainson's Hawk		s		o
White-tailed Hawk		s		o
Zone-tailed Hawk		s		o
Hawaiian Hawk		+		o
Red-tailed Hawk		s		o
Ferruginous Hawk		s		o
Rough-legged Hawk		s	X	X
Golden Eagle		s		X
FALCONIDAE (Caracaras and Falcons)		O		
Crested Caracara		s		o
Eurasian Kestrel		+		o
American Kestrel		s		o
Merlin		s		X
Aplomado Falcon		s		o
Peregrine Falcon		s	X	X
Gyrfalcon		+	X	X
Prairie Falcon		s		o
RALLIDAE (Rails, Gallinules, and Coots)	O	O		
Yellow Rail	s	s		o
Black Rail	+	s		o
Corn Crake	s	+		o
Clapper Rail	s	s		o
King Rail	s	s		o
Virginia Rail	s	s		o
Sora	s	s		o
Yellow-breasted Crake	+	s		o
Purple Gallinule	s	s		o
Common Moorhen	s	s	X	o
Eurasian Coot	s	+	X	X
Hawaiian (=American) Coot	+	+		o
American Coot	s	s		o
Caribean Coot	+	+		o
ARAMIDAE (Limpkins)		O		
Limpkin		s		
GRUIDAE (Cranes)	O	O		
Sandhill Crane	s	s	X	X

Common Crane				X
Whooping Crane	s	s		o
CHARADRIIDAE (Plovers and Lapwings)	O	O		
Northern Lapwing	s	+		o
Black-bellied Plover	s	s		X
American (=Lesser) Golden-Plover	s	s	X	X
Pacific (=Lesser) Golden-Plover	s	s		o
Mongolian Plover	s	+	X	X
Great Sand Plover			X	o
Snowy Plover	s	s	X	o
Wilson's Plover	s	s		o
Common Ringed Plover	s	+	X	o
Semipalmated Plover	s	s		X
Piping Plover	s	s		o
Little Ringed Plover			X	X
Killdeer	s	s		o
Mountain Plover	s	s		o
Eurasian Dotterel	+	+	X	X
HAEMATOPODIDAE (Oystercatchers)	O	O		
American Oystercatcher	s	s		
Black Oystercatcher	s	s		
RECURVIROSTRIDAE (Stilts and Avocets)	O	O		
Black-necked Stilt	s	s		
American Avocet	s	s		
JACANIDAE (Jacanas)		O		
Northern Jacana		s		
SCOLOPACIDAE (Sandpipers, Phalaropes, and Allies)	O	O		
Common Greenshank	s	+	X	X
Greater Yellowlegs	s	s	X	o
Lesser Yellowlegs	s	s		o
Marsh Sandpiper				X
Spotted Redshank	s	+	X	X
Wood Sandpiper	+	+	X	X
Solitary Sandpiper	s	s		o
Willet	s	s		o
Wandering Tattler	s	s	X	X
Gray-tailed Tattler	+	+	X	X
Common Sandpiper	+	+	X	X
Spotted Sandpiper	s	s		o
Terek Sandpiper	+	+		X
Upland Sandpiper	s	s		o
Little (=Least) Curlew			X	
Eskimo Curlew	s	s	X	o

Whimbrel	s	s	X	X
Bristle-thighed Curlew	s	+	X	o
Far Eastern Curlew	s	+	X	X
Long-billed Curlew	s	s		o
Black-tailed Godwit	s	+		X
Hudsonian Godwit	s	s		o
Bar-tailed Godwit	s	+	X	X
Marbled Godwit	s	s		o
Ruddy Turnstone	s	s	X	X
Black Turnstone	s	s		o
Surfbird	s	s		o
Great Knot	+	+	X	X
Red Knot	s	s	X	X
Sanderling	s	s	X	X
Semipalmated Sandpiper	s	s		o
Western Sandpiper	s	s		X
Red-necked (=Rufous-necked) Stint	s	+	X	X
Little Stint	s	+		o
Temminck's Stint	s	+	X	X
Long-toed Stint	+	+	X	X
Least Sandpiper	s	s	X	o
White-rumped Sandpiper	s	s		o
Baird's Sandpiper	s	s	X	X
Pectoral Sandpiper	s	s	X	X
Sharp-tailed Sandpiper	s	+	X	X
Purple Sandpiper	s	+		o
Rock Sandpiper	s	+		X
Dunlin	s	s	X	X
Curlew Sandpiper	s	+	X	X
Stilt Sandpiper	s	s		o
Spoonbill Sandpiper	s	+	X	X
Broad-billed Sandpiper	s	+	X	X
Buff-breasted Sandpiper	s	s	X	X
Ruff	s	+	X	X
Short-billed Dowitcher	s	s		o
Long-billed Dowitcher	s	s	X	X
Jack Snipe			X	X
Common Snipe	s	s	X	X
Pin-tailed Snipe				X
Swinhoe's Snipe			X	X
Eurasian Woodcock	s	+		o
American Woodcock	s	s		o
Wilson's Phalarope	s	s		X
Red-necked Phalarope	s	s	X	X
Red Phalarope	s	s	X	X
LARIDAE (Skuas, Gulls, Terns, and Skimmers)	O	O		
Pomarine Jaeger	s	s	X	X
Parasitic Jaeger	s	s	X	X

Long-tailed Jaeger	s	s	X	X
Great Skua	s	+	X	o
South Polar Skua	s	s		o
Laughing Gull	s	s		o
Franklin's Gull	s	s		o
Little Gull	s	s		o
Black-headed (=Common Black-headed) Gull	s	s	X	X
Bonaparte's Gull	s	s		o
Heermann's Gull	s	s		o
Mew Gull	s	s		X
Ring-billed Gull	s	s		o
California Gull	s	s		o
Herring Gull	s	s	X	X
Thayer's Gull	s	s		o
Iceland Gull	s	+		o
Lesser Black-backed Gull	s	s		o
Slaty-backed Gull	s	+	X	X
Yellow-footed Gull	+	s		o
Western Gull	s	s		o
Glaucous-winged Gull	s	s	X	X
Glaucous Gull	s	s	X	X
Great Black-backed Gull	s	+		o
Black-legged Kittiwake	s	s	X	X
Red-legged Kittiwake	+	+		X
Ross' Gull	s	+		X
Sabine's Gull	s	s	X	X
Ivory Gull	s	+	X	X
Gull-billed Tern	s	s		o
Caspian Tern	s	s		o
Royal Tern	s	s		o
Elegant Tern	s	s		o
Sandwich Tern	s	s		o
Roseate Tern	s	s		o
Common Tern	s	s	X	X
Arctic Tern	s	s		X
Aleutian Tern	+	+	X	X
Forster's Tern	s	s		o
Least Tern	s	s		o
Little Tern			X	
Black-naped Tern			X	o
Gray-backed Tern	+	+	X	o
Bridled Tern	s	s	X	o
Sooty Tern	s	s	X	o
White-winged Tern	s	+	X	X
Black Tern	s	s		o
Brown Noddy	+	s	X	o
Black Noddy	+	s		o
Lesser Noddy			X	
Blue-gray Noddy	+	+	X	o

White Tern	+	s	X	o
Black Skimmer	s	s		o
ALCIDAE (Auks, Murres, and Puffins)	O	O		
Dovekie	s	+		o
Common Murre	s	s	X	X
Thick-billed Murre	s	+	X	X
Razorbill	s	+		o
Black Guillemot	s	+		X
Pigeon Guillemot	s	s	X	X
Marbled Murrelet	s	+		X
Kittlitz's Murrelet	+	+		X
Xantus' Murrelet	s	s		o
Craveri's Murrelet	+	s		o
Ancient Murrelet	s	s	X	X
Cassin's Auklet	s	s		o
Paraket Auklet	s	+	X	X
Least Auklet	s	+	X	X
Whiskered Auklet	+	+	X	X
Crested Auklet	s	s	X	X
Rhinoceros Auklet	s	s	X	o
Tufted Puffin	s	+	X	X
Atlantic Puffin	s	+		o
Horned Puffin	s	+	X	X
COLUMBIDAE (Pigeons and Doves)	O	O		
Scaly-naped Pigeon	+	o		
White-crowned Pigeon	+	s		
Red-billed Pigeon	+	s		
Plain Pigeon	+	+		
Band-tailed Pigeon	s	s		
White-winged Dove	+	s		
Zenaida Dove	+	s		
Mourning Dove	s	s		
Inca Dove	+	s		
Common Ground-Dove	+	s		
Ruddy Ground-Dove	s	s		
White-tipped Dove	+	s		
Key West Quail-Dove	+	+		
Bridled Quail-Dove	+	+		
Ruddy Quail-Dove	+	s		
CUCULIDAE (Cuckoos, Roadrunners, and Allies)	O	O		
Common Cuckoo	+	+	X	X
Oriental Cuckoo	+	+	X	X
Hodgson's Hawk-Cuckoo			X	X
Black-billed Cuckoo	s	s		o
Yellow-billed Cuckoo	s	s		o
Mangrove Cuckoo	+	s		o

Greater Roadrunner	+	s		o
Puerto Rican Lizard-Cuckoo	+	+		o
Smooth-billed Ani	+	+		o
Groove-billed Ani	s	s		o
TYTONIDAE (Barn-Owls)		O		
Barn Owl (=Common Barn-Owl)		s		
STRIGIDAE (Typical Owls)		O		
Flammulated Owl		s		o
Eastern Screech-Owl		s		o
Western Screech-Owl		s		o
Whiskered Screech-Owl		s		o
Puerto Rican Screech-Owl		+		o
Great Horned Owl		s		o
Snowy Owl		+	X	X
Hawk Owl (=Northern Hawk-Owl)		+		X
Northern Pygmy-Owl		s		o
Ferruginous Pygmy-Owl		s		o
Elf Owl		s		o
Burrowing Owl		s		o
Spotted Owl		s		o
Barred Owl		s		o
Great Gray Owl		+		o
Long-eared Owl		s		o
Short-eared owl		s	X	X
Boreal Owl		+		X
Northern Saw-whet Owl		s		o
CAPRIMULGIDAE (Goatsuckers)	O	O		
Lesser Nighthawk	s	s		
Common Nighthawk	s	s		
Antillean Nighthawk	+	+		
Pauraque (=Common Pauraque)	+	s		
Common Poorwill	s	s		
Chuck-will's-widow	s	s		
Buff-collared Nightjar	+	s		
Whip-poor-will	s	s		
Puerto Rican Nightjar	+	+		
Jungle Nightjar			X	
APODIDAE (Swifts)	O	O		
Black Swift	s	s		o
White-collared Swift		?		
Chimney Swift	s	s		o
Vaux's Swift	s	s		o
White-throated Needletail				X
Common Swift				X
Fork-tailed Swift			X	X
White-throated Swift	s	s		o

Antillean Palm Swift	+	+		o
TROCHILIDAE (Hummingbirds)	O	O		
Green Violet-ear	+	s		
Antillean Mango	+	+		
Green Mango	+	+		
Green-throated Carib	+	+		
Antillean Crested Hummingbird	+	+		
Puerto Rican Emerald	+	+		
Broad-billed Hummingbird	+	s		
White-eared Hummingbrd	+	s		
Berylline Hummingbird	+	s		
Buff-bellied Hummingbird	+	s		
Violet-crowned Hummingbird	+	s		
Blue-throated Hummingbird	+	s		
Magnificent Hummingbird	+	s		
Plain-capped Starthroat	+	s		
Bahama Woodstar	+	+		
Lucifer Hummingbird	+	s		
Ruby-throated Hummingbird	s	s		
Black-chinned Hummingbird	s	s		
Anna's Hummingbird	s	s		
Costa's Hummingbird	s	s		
Calliope Hummingbird	s	s		
Broad-tailed Hummingbird	+	s		
Rufous Hummingbird	s	s		
Allen's Hummingbird	+	s		
TROGONIDAE (Trogons)		O		
Elegant Trogon		s		
Eared Trogon		s		
UPUPIDAE (Hoopoes)				
Hoopoe				X
ALCEDINIDAE (Kingfishers)		O		
Ringed Kingfisher		s		
Belted Kingfisher		s		
Green Kingfisher		s		
PICIDAE (Woodpeckers and Allies)	O	O		
Eurasian Wryneck			X	X
Lewis' Woodpecker	s	s		o
Red-headed Woodpecker	s	+		o
Acorn Woodpecker	+	s		o
Gila Woodpecker	+	s		o
Golden-fronted Woodpecker	+	s		o
Red-bellied Woodpecker	s	+		o
Puerto Rican Woodpecker	+	+		o
Yellow-bellied Sapsucker	s	s		o

Red-naped (=Yellow-bellied) Sapsucker	s	s	o
Red-breasted Sapsucker	s	s	o
Williamson's Sapsucker	s	s	o
Ladder-backed Woodpecker	+	s	o
Nuttall's Woodpecker	s	s	o
Downy Woodpecker	s	s	o
Hairy Woodpecker	s	s	o
Strickland's Woodpecker	+	s	o
Red-cockaded Woodpecker	+	+	o
White-headed Woodpecker	s	+	o
Three-toed Woodpecker	s	+	o
Black-backed Woodpecker	s	+	o
Northern Flicker	s	s	o
Gilded (=Northern Flicker)	+	s	o
Pileated Woodpecker	s	+	o
Ivory-billed Woodpecker	+	+	o
TYRANNIDAE (Tyrant Flycatchers)	O	O	
Caribbean Elaenia	+	s	
Northern Beardless-Tyrannulet	+	s	
Olive-sided Flycatcher	s	s	
Greater Pewee	+	s	
Western Wood-Pewee	s	s	
Eastern Wood-Pewee	s	s	
Lesser Antillean Pewee	+	+	
Yellow-bellied Flycatcher	s	s	
Acadian Flycatcher	s	s	
Alder Flycatcher	s	s	
Willow Flycatcher	s	s	
Least Flycatcher	s	s	
Hammond's Flycatcher	s	s	
Dusky Flycatcher	s	s	
Gray Flycatcher	s	s	
Pacific-slope (=Western) Flycatcher	s	s	
Cordilleran (=Western) Flycatcher	s	s	
Buff-breasted Flycatcher	+	s	
Black Phoebe	s	s	
Eastern Phoebe	s	s	
Say's Phoebe	s	s	
Vermilion Flycatcher	s	s	
Dusky-capped Flycatcher	+	s	
Ash-throated Flycatcher	s	s	
Nutting's Flycatcher		?	
Great Crested Flycatcher	s	s	
Brown-crested Flycatcher	s	s	
Puerto Rican Flycatcher	+	+	
Great Kiskadee	+	s	
Sulphur-bellied Flycatcher	+	s	
Tropical Kingbird	s	s	
Couch's Kingbird	+	s	

Cassin's Kingbird	s	s		
Thick-billed Kingbird	s	s		
Western Kingbird	s	s		
Eastern Kingbird	s	s		
Gray Kingbird	s	s		
Loggerhead Kingbird	+	+		
Scissor-tailed Flycatcher	s	s		
Fork-tailed Flycatcher	s	s		
Rose-throated Becard	+	s		
ALAUDIDAE (Larks)	O	O		
Sky (=Eurasian) Lark (=Skylark)	+	+	X	X
Horned Lark	s	s		X
HIRUNDINIDAE (Typical Swallows)	O	O		
Purple Martin	s	s		o
Cuban Martin	+	+		o
Caribbean Martin	+	+		o
Gray-breasted Martin	+	s		o
Tree Swallow	s	s		X
Violet-green Swallow	s	s		o
Bahama Swallow	+	+		o
Northern Rough-winged Swallow	s	s		o
Bank Swallow	s	s	X	X
Cliff Swallow	s	s		X
Cave Swallow	s	s		o
Barn Swallow	s	s	X	X
Common House-Martin				X
CORVIDAE (Jays, Magpies, and Crows)		O		
Gray Jay		+		o
Steller's Jay		s		o
Blue Jay		+		o
Green Jay		s		o
Brown Jay		s		o
Florida (=Scrub) Scrub-Jay (=Jay)		+		o
Island (=Scrub) Scrub-Jay (=Jay)		+		o
Western (=Scrub) Scrub-Jay (=Jay)		s		o
Gray-breasted Jay		s		o
Pinyon Jay		s		o
Clark's Nutcracker		s		o
Black-billed Magpie		+		o
Yellow-billed Magpie		+		o
American Crow		s		o
Northwestern Crow		+		o
White-necked Crow		+		o
Mexican Crow		s		o
Fish Crow		+		o
Hawaiian Crow		+		o
Chihuahuan Raven		+		o

Common Raven		s		X
PARIDAE (Titmice)	O	O		
Black-capped Chickadee	s	+		
Carolina Chickadee	s	+		
Mexican Chickadee	+	s		
Mountain Chickadee	s	s		
Siberian Tit	s	+		
Boreal Chickadee	s	+		
Chestnut-backed Chickadee	s	+		
Bridled Titmouse	+	s		
Plain Titmouse	+	s		
Tufted Titmouse	s	+		
REMIZIDAE (Verdins)		O		
Verdin		s		
AEGITHALIDAE (Bushtits)	O	O		
Bushtit	s	s		
SITTIDAE (Nuthatches)	O	O		
Red-breasted Nuthatch	s	s		
White-breasted Nuthatch	s	s		
Pygmy Nuthatch	s	s		
Brown-headed Nuthatch	+	+		
CERTHIIDAE (Creepers)	O	O		
Brown Creeper	s	s		
TROGLODYTIDAE (Wrens)	O	O		
Cactus Wren	+	s		
Rock Wren	s	s		
Canyon Wren	s	s		
Carolina Wren	s	s		
Bewick's Wren	s	s		
House Wren	s	s		
Winter Wren	s	s		
Sedge Wren	s	s		
Marsh Wren	s	s		
CINCLIDAE (Dippers)	O			
American Dipper	s			
MUSCICAPIDAE (Kinglets, Gnatcatchers, Thrushes, and Allies)	O			
Middendorff's Grasshopper-Warbler	+	+	X	X
Arctic Warbler	+	s	X	X
Willow Warbler				X
Golden-crowned Kinglet	s	s		o
Ruby-crowned Kinglet	s	s		o

Blue-gray Gnatcatcher	s	s		o
Black-tailed Gnatcatcher	+	s		o
California (=Black-tailed) Gnatcatcher	+	s		o
Black-capped Gnatcatcher	+	s		o
Gray-spotted Flycatcher			X	X
Narcissus Flycatcher			X	
Turdinae	O	O		
Siberian Rubythroat	s	+	X	X
Bluethroat	s	+		X
Blue Rock Thrush				X
Northern Wheatear	s	s		X
Eastern Bluebird	s	s		o
Western Bluebird	s	s		o
Mountain Bluebird	s	s		o
Townsend's Solitaire	s	s		o
Kamao (=Hawaiian Thrush)	+	+		o
Olomao (=Hawaiian Thrush)	+	+		o
Omao (=Hawaiian Thrush)	+	+		o
Puaiohi (=Small Hawaiian Thrush)	+	+		o
Veery	s	s		o
Gray-cheeked Thrush	s	s		X
Bicknell's (=Gray-cheeked) Thrush	s	+		o
Swainson's Thrush	s	s		X
Hermit Thrush	s	s		o
Wood Thrush	s	s		o
Red-legged Thrush	+	+		o
Eyebrowed (=Eye-browed) Thrush	+	+	X	X
Dusky Thrush	+	+		o
Fieldfare				X
Clay-colored Robin	+	s		o
Rufous-backed Robin	+	s		o
American Robin	s	s		o
Varied Thrush	s	s		o
Aztec Thrush	+	s		o
MIMIDAE (Mockingbirds, Thrashers, and Allies)	O	O		
Gray Catbird	s	s		
Northern Mockingbird	s	s		
Sage Thrasher	s	s		
Brown Thrasher	s	s		
Long-billed Thrasher	+	s		
Bendire's Thrasher	+	s		
California Thrasher	+	s		
Crissal Thrasher	+	s		
Le Conte's Thrasher	+	s		
Pearly-eyed Thrasher	+	+		
PRUNELLIDAE (Accentors)				
Siberian Accentor			X	X

MOTACILLIDAE (Wagtails and Pipits)	O	O		
Yellow Wagtail	s	+	X	X
Gray Wagtail	s	+	X	X
White Wagtail	s	s	X	X
Black-backed Wagtail	s	+		o
Olive-backed (=Olive) Pipit (=Tree-Pipit)	+	+	X	X
Pechora Pipit	+	+		X
Red-throated Pipit	s	+	X	X
American (=Water) Pipit	s	s	X	X
Sprague"s Pipit	s	s		o
BOMBYCILLIDAE (Waxwings)	O	O		
Bohemian Waxwing	s	+		
Cedar Waxwing	s	s		
PTILOGONATIDAE (Silky-flycatchers)		O		
Phainopepla		s		
LANIIDAE (Shrikes)	O	O		
Northern Shrike	s	+		X
Loggerhead Shrike	s	s		o
STURNIDAE (Starlings)				
Violet-backed Starling			X	
Ashy Starling			X	
VIREONIDAE (Vireos)	O	O		
White-eyed Vireo	s	s		
Puerto Rican Vireo	+	+		
Bell's Vireo	s	s		
Black-capped Vireo	+	s		
Gray Vireo	+	s		
Solitary Vireo	s	s		
Yellow-throated Vireo	s	s		
Hutton's Vireo	s	s		
Warbling Vireo	s	s		
Philadelphia Vireo	s	s		
Red-eyed Vireo	s	s		
Yellow-green (=Red-eyed) Vireo	+	s		
Black-whiskered Vireo	+	s		
EMBERIZIDAE (Emberizids)				
PARULINAE (Wood-Warblers)	O	O		
Bachman's Warbler	+	+		o
Blue-winged Warbler	s	s		o
Golden-winged Warbler	s	s		o
Tennessee Warbler	s	s		o
Orange-crowned Warbler	s	s		o

Nashville Warbler	s	s	o
Virginia's Warbler	s	s	o
Colima Warbler	+	s	o
Lucy's Warbler	+	s	o
Northern Parula	s	s	o
Tropical Parula	+	s	o
Yellow Warbler	s	s	o
Chestnut-sided Warbler	s	s	o
Magnolia Warbler	s	s	o
Cape May Warbler	s	s	o
Black-throated Blue Warbler	s	s	o
Yellow-rumped Warbler	s	s	X
Black-throated Gray Warbler	s	s	o
Townsend's Warbler	s	s	o
Hermit Warbler	s	s	o
Black-throated Green Warbler	s	s	o
Golden-cheeked Warbler	+	s	o
Blackburnian Warbler	s	s	o
Yellow-throated Warbler	s	s	o
Grace's Warbler	+	s	o
Adelaide's Warbler	+	+	o
Pine Warbler	s	s	o
Kirtland's Warbler	s	+	o
Prairie Warbler	s	s	o
Palm Warbler	s	s	o
Bay-breasted Warbler	s	s	o
Blackpoll Warbler	s	s	o
Cerulean Warbler	s	s	o
Elfin Woods Warbler	+	+	o
Black-and-white Warbler	s	s	o
American Redstart	s	s	o
Prothonotary Warbler	s	s	o
Worm-eating Warbler	s	s	o
Swainson's Warbler	s	s	o
Ovenbird	s	s	o
Northern Waterthrush	s	s	X
Louisiana Waterthrush	s	s	o
Kentucky Warbler	s	s	o
Connecticut Warbler	s	+	o
Mourning Warbler	s	s	o
MacGillivray's Warbler	s	s	o
Common Yellowthroat	s	s	o
Gray-crowned Yellowthroat	+	s	o
Hooded Warbler	s	s	o
Wilson's Warbler	s	s	o
Canada Warbler	s	s	o
Red-faced Warbler	+	s	o
Painted Redstart	s	s	o
Slate-throated Redstart		?	
Golden-crowned Warbler	+	s	o

Rufous-capped Warbler	+	s	o
Yellow-breasted Chat	s	s	o
Olive Warbler	+	s	o
THRAUPINAE (Tanagers)	O	O	
Stripe-headed Tanager	+	s	
Puerto Rican Tanager	+	+	
Hepatic Tanager	+	s	
Summer Tanager	s	s	
Scarlet Tanager	s	s	
Western Tanager	s	s	
Antillean Euphonia	+	+	
CARDINALINAE (Cardinals, Grosbeaks, and Allies)	O	O	
Crimson-collared Grosbeak	+	s	
Northern Cardinal	s	s	
Pyrrhuloxia	+	s	
Yellow Grosbeak	+	s	
Rose-breasted Grosbeak	s	s	
Black-headed Grosbeak	s	s	
Blue Grosbeak	s	s	
Lazuli Bunting	s	s	
Indigo Bunting	s	s	
Varied Bunting	+	s	
Painted Bunting	s	s	
Dickcissel	s	s	
EMBERIZINAE (Sparrows and Allies)	O	O	
Olive Sparrow	+	s	o
Green-tailed Towhee	s	s	o
Eastern (=Rufous-sided) Towhee	s	+	o
Spotted (=Rufous-sided) Towhee	s	s	o
Canyon (=Brown) Towhee	+	s	o
California (=Brown) Towhee	+	s	o
Abert's Towhee	+	s	o
White-collared Seedeater	+	s	o
Yellow-faced Grassquit	+	s	o
Black-faced Grassquit	+	+	o
Puerto Rican Bullfinch	+	+	o
Bachman's Sparrow	s	+	o
Botteri's Sparrow	+	s	o
Cassin's Sparrow	s	s	o
Rufous-winged Sparrow	+	s	o
Rufous-crowned Sparrow	+	s	o
American Tree Sparrow	s	+	o
Chipping Sparrow	s	s	o
Clay-colored Sparrow	s	s	o
Brewer's Sparrow	s	s	o
Field Sparrow	s	s	o
Worthen's Sparrow	+	s	o
Black-chinned Sparrow	+	s	o
Vesper Sparrow	s	s	o

Lark Sparrow	s	s		o
Black-throated Sparrow	s	s		o
Sage Sparrow	s	s		o
Five-striped Sparrow	+	s		o
Lark Bunting	s	s		o
Savannah Sparrow	s	s		X
Baird's Sparrow	s	s		o
Grasshopper Sparrow	s	s		o
Henslow's Sparrow	s	+		o
Le Conte's Sparrow	s	s		o
Saltmarsh Sharp-tailed (=Sharp-tailed) Sparrow	s	+		o
Nelson's Sharp-tailed (=Sharp-tailed) Sparrow	s	s		o
Seaside Sparrow	s	s		o
Fox Sparrow	s	s	X	X
Song Sparrow	s	s		o
Lincoln's Sparrow	s	s		o
Swamp Sparrow	s	s		o
White-throated Sparrow	s	s		o
Golden-crowned Sparrow	s	s	X	o
White-crowned Sparrow	s	s	X	o
Harris' Sparrow	s	+		o
Dark-eyed Junco	s	s		X
Yellow-eyed Junco	+	s		o
Rustic Bunting	s	+	X	X
Pallas' Bunting (=Reed-Bunting)				X
Reed (=Common) Bunting (=Reed-Bunting)	+	+		o
McCown's Longspur	s	s		o
Lapland Longspur	s	s		X
Smith's Longspur	s	+		o
Chestnut-collared Longspur	s	s		o
Snow Bunting	s	+		X
McKay's Bunting	s	+		o
ICTERIDAE (Blackbirds and Allies)	O	O		
Boblink	s	s		
Red-winged Blackbird		s		
Tricolored Blackbird		s		
Tawny-shouldered Blackbird		+		
Yellow-shouldered Blackbird		+		
Eastern Meadowlark	s	s		
Western Meadowlark	s	s		
Yellow-headed Blackbird		s		
Rusty Blackbird		s		
Brewer's Blackbird		s		
Great-tailed Grackle		s		
Boat-tailed Grackle		+		
Common Grackle		+		
Greater Antillean Grackle		+		
Shiny Cowbird		+		

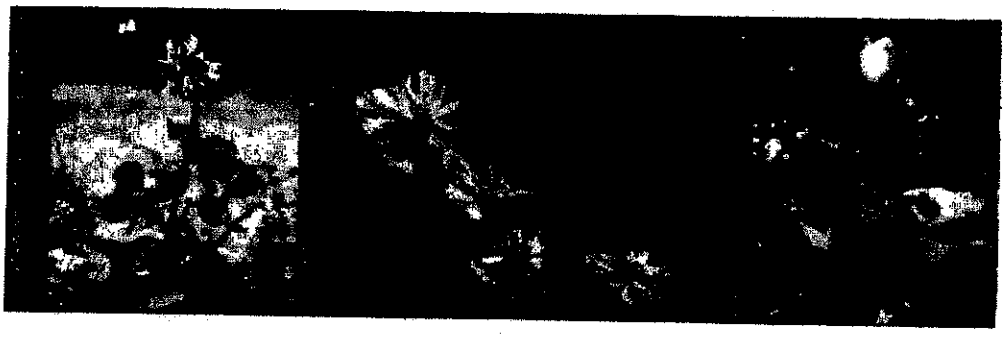
Bronzed Cowbird		s		
Brown-headed Cowbird		s		
Black-cowled Oriole	s	s		
Black-vented Oriole		?		
Orchard Oriole	s	s		
Hooded Oriole	+	s		
Streak-backed Oriole	+	s		
Altamira Oriole	+	s		
Audubon's Oriole	+	s		
Baltimore (=Northern) Oriole	s	s		
Bullock's (=Northern) Oriole	s	s		
Scott's Oriole	s	s		
FRINGILLIDAE (Finches)	O	O		
FRINGILLINAE	O	O		
Brambling	s	+	X	X
CARDUELINAE	O	O		
Black (=Rosy) Rosy-Finch (=Finch)	+	+		o
Brown-capped (=Rosy) Rosy-Finch (=Finch)	+	+		o
Gray-crowned (=Rosy) Rosy-Finch (=Finch)	s	+		o
Pine Grosbeak	s	+	X	o
Common Rosefinch	+	+		X
Purple Finch	s	s		o
Cassin's Finch	s	s		o
House Finch	s	s		o
Red Crossbill	s	s		o
White-winged Crossbill	s	+		o
Common Redpoll	s	+	X	X
Hoary Redpoll	s	+	X	X
Pine Siskin	s	s		o
Lesser Goldfinch	s	s		o
Lawrence's Goldfinch	+	s		o
American Goldfinch	s	s		o
Oriental Greenfinch	+	+		o
Eurasian Bullfinch	+	+	X	X
Evening Grosbeak	s	s		o
Hawfinch	+	+	X	X

EXHIBIT
CR 16

In two communities in Nagano Prefecture an increasing number of citizens are complaining of swollen lymph glands and muscle pain, and at the same time deformities are appearing in plants. The causes have not been clarified, but some people suspect that the electromagnetic waves from mobile phone base stations may be a factor.

Ms. A (40) of Ina City began suffering from headaches, fatigue and eye pain in 2002. Her condition gradually worsened, and when she was at home, while studying for a skills qualification exam, she found herself unable to concentrate, had a hard time remembering, and had attacks of dizziness.

Last year unusual changes she had never seen before in the plants in her garden began to appear.



Captions: Left to right

Shirotsumekusa with a fasciated stem extending from the center of a flower. Another flower blooms at the tip of the extended stem.

Five or six cosmos flowers appeared with the disk flower (the yellow center part) turning petal-like. Photographed in October 2004.

A tulip with one leaf aggrandized. Photographed approximately 300 meters from the DoCoMo Base Station.From left to right, bottom:

Captions: Left to right

Narcissuses with a mixture of split and not split corolla. Approximately 300 meters from the DoCoMo Base Station.

Dandelion with abnormally fat stems and more than one flower on each stem. The B family first observed four years ago, and it has reappeared every year since.

Near the B family, a mutation was observed this spring on butterbur flowers. The stems, fasciated, are stuck together half way down.

At the same time, at the home of Mr. B (44), who lives in the town of Takaou, some 25 kilometers from Ina, the health of family members deteriorated. They experienced unusual symptoms for the first time, things like chronic exhaustion, itching hands and feet, and a sudden rise in blood pressure to double their normal levels. And many of the dandelions in his garden developed fasciation, an abnormal thickening of the stem.

Besides the strange phenomena seen in plants and the deterioration in peoples' health, these two communities have something else in common. Mobile phone base stations were built in both communities a year before the oddities occurred. A Vodafone base station is located about 200 meters from A's house, and an NTT base station is about 250 meters from B's house.

Eyesight deterioration, swelling of lymph glands

Electromagnetic waves from mobile phones are thought to damage cells and cause diseases like leukemia and brain tumor, but they also seem to cause more commonplace health problems.

According to a survey by the Applied National Science Laboratory in France, more people living near mobile phone base stations have health problems than people not exposed to mobile phone electromagnetic waves. And women suffer particularly from headaches, nausea and poor appetite.

Research by the Dutch Economic Ministry points out that electromagnetic waves from third generation mobile phones (3G) may cause headaches and nausea. When irradiated with electromagnet waves of the same strength as those of 3G, the number of people who complained of headaches and nausea was considerably greater than those exposed to electromagnetic waves from previous types of mobile phones.

Ms. A, suspecting that the electromagnetic waves from mobile phones might be the cause of the deformed plants and her health problems, conducted a survey of 30 people living within 300 meters of the Vodafone base station.

The findings revealed that 20 per cent of residents suffered deteriorating eyesight after the mobile phone base station was built. As many as 16 per cent complained of swollen lymph glands in the neck and underarms, and muscle pain. And 13 per cent experienced declines in their ability to think, concentrate and remember. Furthermore, 13 percent reported having noticed unusual phenomena in the flowers and vegetables growing nearby.

1. The high frequency electromagnetic waves in Ms. A and Mr. B's homes measure maximums of between 0.1375 and 0.717 microwatts per square centimeter (a unit that shows the quantity of heat passing through 1 square centimeter). Is this a safe level for an everyday life environment?

Permissible levels for mobile phone electromagnetic waves are set very high in

Japan, at 600 and 1000 microwatts per square centimeter (differing with the frequency band).

But the city of Salzburg in Austria has much tougher standards (0.1 microwatts per square centimeter), and in Paris, France a stiff standard has been set of an average over 24 hours of 1.06 microwatts per square centimeter. The prevalence of stone houses in Europe, moreover, means that levels are probably lower indoors there. Some researchers think that levels should be set even lower, such as at 0.00002 microwatts per square centimeter. (Note 1)

Aware of the possibility of damage to health from exposure to even low doses over long periods of time, Ms. A and others put up shield cloth over the windows and wall of their houses on the side of the mobile phone base station to block the electromagnetic waves. She found that her symptoms were clearly lessened in the room with shield cloth and her fatigue and palpitations alleviated. Using a high frequency measurement instrument, she found the level decreased more than 94 per cent (Note 2)

Deformed plants nationwide?

A TV Asahi program, "Super Morning", reported that fasciation in dandelions was on the rise throughout the country, and that it was thought that seeds might be being produced that were sensitive to chemical substances as a result of increased crossbreeding between Western dandelions and Japanese dandelions. But in Ina and Takaou irregularities are occurring in plants other than dandelions, and there are more species with irregularities every year.

In an organic farm 180 meters from the mobile phonestation, a cucumber was found with a leaf growing out of the fruit.

According to Professor Yamamoto Kotaro, who is studying plant morphology function at Hokkaido University, "there is a gene that suppresses the area of the growth point at the apex of the stem that makes the stem, but when that gene is destroyed the fasciation that thickens the stem occurs." He adds that "a flower is basically a leaf that has evolved, so that when the gene that transforms a leaf into a flower is destroyed the flower reverts to a leaf. Unusual phenomena like the mutation of a stamen into a petal or of a petal into a calyx can also easily occur."

The influence of agricultural chemicals and other chemical substances and of electromagnetic waves are usually thought to be behind such genetic irregularities. But at the homes in Nagano where the strange modifications in plants and humans are occurring, agricultural chemicals have not been used for nearly ten years, and one family has been raising vegetables the traditional, chemical-free way for fifty-five years.

In nature, sudden abnormalities in plants can occur due to cosmic rays, but in the case of seed-bearing plants such abnormalities are believed to occur at a rate of only 1 in 100,000.

Fasciation and stamens becoming petals are occurring in many of the plants around Ms. A's house, plants like cosmos, daffodils, Dutch clover, bergamots, poppy anemones. Without surveying the whole area, it is not possible to give an accurate estimate of the rate of occurrence of these abnormalities, but they would seem to be occurring at a rate higher than 1 in 100,000.

Also, for example, a maple in Ms. A's yard grew a whole meter last summer. An umbrella pine, a species that normally grows 10 centimeters a year, grew 25 centimeters last year, and as of June this year, had already grown 10 centimeters. And a castor aralia grew 95 centimeters this spring alone.

There is not much research on the relationship between electromagnetic waves and plants, but a study by the University of Michigan of trees located between 50 and 150 meters of a Navy communications antenna that emits ultralow frequency electromagnetic waves revealed that the growth of maples increased by 74 per cent. One theory is that radiation may cause an increase in the absorption rate of carbon dioxide. Another is that electromagnetic waves hasten plant growth.

The environment in which we live has changed enormously in the last fifty years. Man-made electromagnetic waves have drastically increased as has pollution from chemicals. A combination of these factors may be giving rise to changes in plants and animals, humans included.

Notes

1. Ogino Koya. Puroburemu Q&A, abunai keitai denwa [Problem Q&A: dangerous electromagnetic waves], Ryokufu Shuppan.

2. The high frequency instrument used measures not only mobile phone electromagnetic waves but also electromagnetic waves from TV and radio high frequency bands. It measures the electrical field and converts it into power density

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Translated for Japan Focus by Jean Inglis, a translator, and citrus grower living in Hiroshima prefecture.

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Chapter 11

Brief Overview of the Effects of Electromagnetic Fields on the Environment

By: Raymond S. Kasevich, BSEE, MSE, PE

Introduction

The generation, radiation, and propagation of electromagnetic waves are generally well understood from both the engineering and scientific viewpoints. What is less well understood is the effect of the interaction of electromagnetic fields or waves with material and biological systems — such as humans, animals, plants, trees, and insects.

In clinical medicine, however, there has been considerable success involving the application of microwaves, or radiofrequency energy, especially with thermal (tissue heating) models such as thermal treatment to relieve benign prostatic hyperplasia (BPH), and electrical therapy used to treat cardiac arrhythmia. In fact, radiofrequency ablation of certain types of arrhythmia is now the treatment of choice.

Some tumors are also being treated with microwaves. A very precise temperature range from 41.5 to 44.5 degrees Celsius is required to kill tumors by hyperthermia. Such applications require precise management and control of the electromagnetic energy for proper thermal dosimetry and thermal pattern positioning. Other applications can be found in the attached reference below.[1]

It is vital to remember that, however positive and successful the use of microwave applications are in medicine, they are based on the destructive powers of radiofrequency energy. Precise management and control of this energy is fundamental in any therapeutic application. But once released into the natural environment, it is very difficult to predict radiation patterns with any precision.

The physics of electromagnetic waves, and their interactions with material and biological systems, is based on the concept that the electromagnetic wave is a force field which exerts a mechanical torque, pressure, or force on electrically charged molecules, groups of charged

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[1]Kasevich, R.S., *Understand the Potential of Radiofrequency Energy,* Chemical Engineering Progress, January 1998, American Institute of Chemical Engineers, New York, N.Y., pp. 75 – 81.

molecules, positive or negative ions, free electrical charges, or bound electrical charges that may be in motion, or which may be stationary. A simple example of a charged molecule is ordinary water. The special arrangement of two hydrogen atoms with one atom of oxygen produces what is called an 'electric dipole moment,' which is a positive charge separated from a negative charge at a very small distance of separation (measured in angstroms). All living things contain these electric dipoles. In many cases, the thermal effects produced by absorption of electromagnetic energy is the direct result of water molecules acted upon by the oscillating electric field, thereby rubbing against each other to produce heat. Sometimes, non-thermal effects are produced, but they are much more difficult to understand and separate from electromagnetically induced thermal effects.

Trees, plants, soil, grass, shrubs, etc. have the ability to absorb electromagnetic wave energy over a very broad range of wavelengths. Water molecules, ions, and molecularly charged groups within the cellular structure of these items will interact, and generate volumetric heating, as well as other bioeffects. Electromagnetic bioeffects in humans and animals have been intensively studied.[2] Research work is continuing to understand low-level bioeffects at intensities lower than about 10 milliwatts per square centimeter ($10 mW/cm^2$), for example, at microwave frequencies.

Electromagnetic radiation in the microwave or radiofrequency bands from cell-tower antennas will interact to some extent with all surrounding vegetation and wildlife. Even though the main beam within half-power points of a microwave antenna is generally directed above treetop level, sidelobe energy and backlobe energy is present — albeit at considerably lower power levels. These levels depend on where a microwave antenna is pointing, the aperture size, the power gain, the frequency and the height above ground level at which an antenna is mounted.

At lower radiofrequencies, when dipoles or monopoles are employed for radiation, the radiation pattern is not beam-like but rather is shaped like a giant doughnut in an omnidirectional pattern. In this case the wave propagation is over 360 degrees of azimuth and follows a cosine pattern in the far field and in the vertical plane of the antenna pattern for any radial cut through the pattern. Energy will easily propagate toward the ground and upward with this type of antenna, which is a normal free space mode of propagation.

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[2] *Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields*, NCRP Report No. 86, 1986, 1995, National Council on Radiation Protection and Measurements, Bethesda, MD.

Jungle treetops were used by U.S. troops in the Vietnam War to provide radio communications over long distances by what is known as the lateral wave mode. The energy actually clings to the trees as it propagates. A similar mode of propagation was used by the U.S. Army in Operation Desert Storm. The desert floor guided the wave energy as a lateral mode for combat communications. A horizontal wire along the ground acted as either the transmitting or receiving antenna.

In a forested area, a cell tower may couple energy into this so-called lateral mode of electromagnetic wave propagation. This may result in the shedding of some part of the radiation field energy of the tower antenna directly into trees or along the ground, with the affect of enhanced propagation away from the antenna. The wave energy will attenuate by giving up its energy to the tree branches and trunk, or to ground shrubs, as well as by normal geometric spreading.

It should also be noted that electromagnetic waves that reflect from the ground can theoretically quadruple in power density because of the phase relationships inherent over different propagation pathways. This is known as Fresnel reflection, and the region over ground that produces this effect is defined by Fresnel zones.[3]

The following examples of electromagnetic effects should provide some background and insights on possible electromagnetic effects on vegetation and birds. A short discussion on insect mortality from electromagnetic effects is also included.

Trees

Experiments with pine trees growing within high-tension powerline rights-of-way have shown visible branch damage from induced corona. The needle tips dry out and die back in a kind of self-pruning, as if to escape the electric field. Such studies have been largely confined to the 60-Hertz (Hz) range, but with the advent of extensive radio and microwaves in the environment, any material capable of absorbing electromagnetic energy will tend to heat thin dielectric objects such as pine needles.[4] The thinness factor actually amplifies the local radiofrequency or microwave electric field intensity because the electric field induced polarization charge in the pine needle is large compared to a hypothetical round dielectrically equivalent object. Polarization charges exist in all dielectric materials and produce

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[3] Beckmann, P., Spizzichino, A., *The Scattering of Electromagnetic Waves from Rough Surfaces*, Pergamon Press Ltd., Oxford, England, 1963.

[4] Levitt, B. B., *Electromagnetic Fields: A Consumer's Guide to the Issues and How to Protect Ourselves*, Harcourt Brace & Company, New York, NY, 1995, p. 498.

electromagnetic effects similar to what one normally associates with free electrons in metal conductors — such as currents when a voltage or electric field is applied.

There is also this important fact: *any tree may act as a receiving dielectric rod or monopole antenna* with the ability to both absorb energy from the wave passing by and to scatter the wave in many directions. If the polarization of the transmitting tower antenna matches the particular tree or trees (i.e., vertical orientation of the antenna which is usually the case for collinear dipole arrays on towers), maximum coupling or absorption of the wave energy by the tree will occur. Polarization and conduction currents will generally flow to the root system.

Dr. Wolfgang Volkrodt, a retired Siemens engineer and physicist in Germany, led an environmental dialogue related to electromagnetic damage to trees over large areas of deforestation in the German and Swiss Alps.[5] *He believed that electromagnetic energy — not acid rain — is the underlying cause of the deforestation.* This is not hard to understand, or believe, in view of the basic physics discussed above and particularly if the frequencies employed cause a resonant interaction between the tree structure and incident wave.

The resonance concept is well known in electromagnetic science and engineering. It encompasses a range of frequencies — from the light technologies all the way to low frequency electromagnetic waves — in the non-ionizing bands of the electromagnetic spectrum. A human being, who is standing, will interact resonantly at the frequency of an incident electromagnetic wave (vertically polarized electric field, which is ½ wavelength of odd or even multiples thereof). In other words, we are capable of acting as receiving antennas for some frequencies. The absorbed energy is maximized under a resonant condition.

The reason the sky appears blue is based on the same principle. But in that situation, it is the scattered light energy that is maximized in the blue light frequency range by a resonant interaction with the atmosphere.

Birds

Electromagnetic fields absorbed by living tissue may produce heat (hyperthermia) and other not-so-well known athermal effects. This absorbed energy is characterized by a number called the Specific Absorption Rate (SAR) which is measured in watts per kilogram of tissue. As an example, it has been shown — both theoretically and with phantom models — that a cell phone held next to the human head will produce a SAR value capable of

[5] Ibid , Chapter 4.

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PULSE MODULATED UHF ENERGY ILLUMINATION OF THE HEART ASSOCIATED WITH CHANGE IN HEART RATE

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RECENTLY Frey[3], the Library of Congress[7], and Kholodov[5], reviewed and evaluated data on the central nervous system effects of illumination by energy in the very high frequency (VHF), ultra high frequency (UHF), and super high frequency (SHF) regions of the electromagnetic spectrum. They concluded the data indicate that the energy affects the nervous system when used at low power densities. More recently, Frey[4] showed that illumination of the head of the cat with pulse modulated UHF energy at low power density (30 microwatts/cm^2, average) evoked potentials in the brain stem. These effects would not be expected in terms of current theory. Beyond implications for theory, there are practical implications since UHF energy has become a pervasive environmental agent in recent years.

There are also reports of heart rate change correlated with VHF energy illumination which have similar implications. These reports include clinical observations such as that of Drogichina, Konchalovskaya, Glotova, Sadchikova, and Snegova[1] and experimental investigations such as those reported by Presman and Levitina. In two joint investigations using rabbits, Presman and Levitina[9,10] report finding small reversible changes in heart rate associated with low intensity VHF energy illumination (λ = 10 cm., 12.5 cm.). The effect on rate was a function of the region of the body illuminated. In general, head illumination

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*** An inaccurate Fed. Proc. translation of a 1964 paper exists.
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was associated with tachycardia and body illumination with bradycardia. More recently, Levitina [6***] reported that illumination of intact frogs with low intensity VHF energy (power density 60 $\mu w/cm^2$, λ = 12.5 cm.) resulted in a change in heart rate similiar to the change observed in rabbits. He suggested that the rate change in the frog was due to an effect on the peripheral nervous system. At the wavelengths he used, one would expect little body penetration of the energy [2,3]. Thus, a skin receptor hypothesis is reasonable. The above cited head illumination data, however, do not fit his hypothesis. The situation is apparently more complex than he suggests.

It seemed likely that the use of UHF energy, which penetrates tissue and is more appropriate as a tool in biological experimentation[3], might clarify the situation. Further, it seemed that if this energy affected the heart, as such, then it would be likely[4] that the effect would appear most clearly when the isolated frog heart was illuminated with low intensity pulsed modulated energy. On a logical basis, the most useful procedure appeared to be sychronization of the UHF energy pulses with the P wave of the ECG in an attempt to induce a positive feedback condition. It was considered possible that this would result in tachycardia, arrhythmia, or fibrillation. Such results did occur as described in the experiment reported below.

Method

Experimental Design. Twenty-two isolated frog hearts were illuminated with UHF energy pulses that were synchronized with the P wave of the ECG. The UHF source was set to emit pulses 10μ sec in duration at a carrier frequency of 1.425 GHz ($\lambda \simeq 20$ cm.). Due to the narrow pulse width, the energy was actually contained within a spectrum centered about the cited frequency. Each ECG P wave triggered a pulse of UHF energy. Hearts were illuminated at the peak of the P wave, 100 msec after the P wave peak, and 200 msec after the P wave peak.

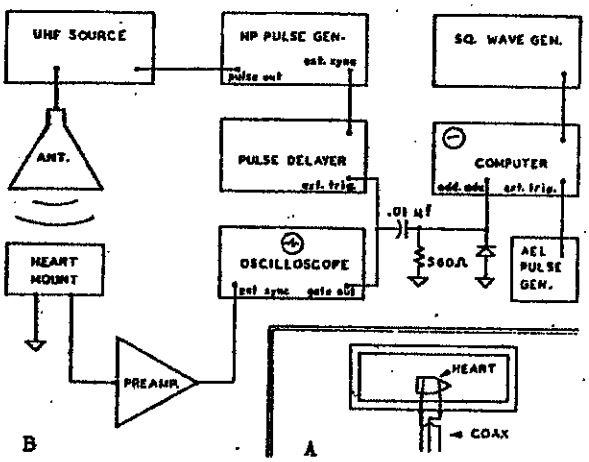
Since the isolated heart beats at a slowly decreasing rate of approximately 1 beat/sec and the rate is stable for at least 20 minutes, each heart was used

for one session of three periods (250 beats/period). During a session, periods of illumination with UHF energy alternated with periods of no illumination. The experiment was counterbalanced by assigning half the hearts within each group to the sequence UHF, no-UHF, UHF, and half to the reverse sequence. The moment to moment change in heart rate was measured and displayed in histogram form with a Technical Measurements Corp Computer of Average Transients, model 1000.

Two control groups were also included in the experiment. One was intended to answer the question of whether exposure of the preparation to UHF energy was necessary to obtain the effect. Thus, several hearts were used as in a regular session, but with two layers of echosorb AN77 (a UHF energy absorber) interposed between the antenna and preparation. The other group was intended to answer the question of whether the UHF energy could induce currents on the recording electrodes to a degree that would effect the preparations' rate of beating. Though preliminary studies with dead hearts showed that the energy of the current induced on the electrodes was negligible, this control was included. Hearts were used as in a regular session, but with the UHF energy replaced with electrical pulses placed across the electrodes.

Apparatus and Procedure. A mount of lucite, a material which causes minimal distortion of a UHF energy field, was constructed to hold platinum electrodes. These electrodes were used to support and record from the heart (Fig. 1A). The electrodes terminated in a teflon insulated subminiature coaxial cable, type RG 196/U. This cable minimized extraneous electrical pickup which might have interfered with data processing or possibly influenced the heart. The mount was located within a test enclosure of Echosorb AN77. AN77 is a UHF energy absorber which allows simulation of a free field by minimizing UHF energy reflection and field distortion. To further minimize distortion of the UHF field in the enclosure and the possibility of UHF energy pickup, the portion of the coaxial cable within the enclosure was carefully positioned perpendicular to the direction of the E vector (electrical field strength).

The coaxial cable terminated in a Tektronix model 2A61 low level pre-amplifier used in conjuction with a Tektronix model 565 oscilloscope. The entire data processing system and the UHF illuminating system are shown in schematic form in Fig 1B and in photographic form in Fig 1C.



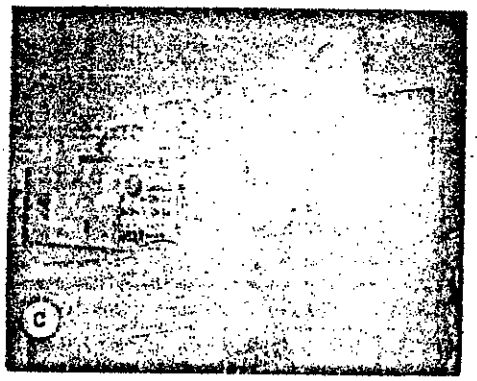


FIG 1

A) Lucite heart mount (view from top) with platinum recording wires terminated in coaxial cable, B) Schematic diagram of data recording and processing system and the UHF illuminating system. All instruments and cable shields were grounded and all cables were coaxial. C) Experimental equipment assembly.

The operation of the systems was as follows: The ECG signal from the heart was amplified by the 2A61 preamplifier. The amplified signal was then inserted into the oscilloscope at the "Ext sync" jack. The oscilloscope sweep triggering level was adjusted so that triggering was synchronized with the peak

ofthe ECG P wave and the sweep was completed just before the next P wave occurred. In this way, the P wave was used as a control signal. When the P wave triggered the sweep, a pulse appeared at the oscilloscope "gate out" jack. This was used, after delaying with a Grass model SD5 stimulator (pulse delayer) and shaping and amplifying with a Hewlett-Packard model 212 pulse generator, as a control pulse to initiate the emission of a pulse of UHF energy from the UHF source. The UHF source was an Applied Microwave Lab., inc. model PG1K Signal Source with rf head model L2110C-1115. The UHF energy was conveyed via coaxial cable to a gain standard horn antenna.[11] The "gate out" pulse was also used, after shaping by a differentiator and diode clamp, to advance the computer to the next address.

The computer was operated as follows: Both the sweep rate (address time) and the trigger selector were set to "external" and the computer was placed into the start mode. The computer sweep could then be started by one pulse (pulse width = 50 μsec., pulse amplitude 10 V.) from the American Electronics Lab model 104 stimulator, used as a control device. The first address in the computer memory then accepted counts from the computer input; in this case, 1 kc square waves from an RCA model WA44C sine and square-wave audio generator, and accumulated them in that address. When a shaped gate pulse arrived at the computer address advance jack, indicating the occurrence of a P wave in the ECG, the computer advanced to the next address and began depositing counts there instead of in the previous address. At the next P wave, the computer advanced to the next address, and so forth. This continued until the desired number of addresses were used, 250 for each treatment (UHF or no-UHF) period.

From the above, it can be seen that the number of counts stored in a particular address is proportional to the time between the occurrence of the P wave which moved the memory to that address and the next P wave. The height of each computer generated light dot on the CRT display indicated the number of counts in each address. Thus, a record of moment to moment change in heart rate was obtained.

The experimental procedure began with the decapitation of a grass frog and removal of the heart. The heart was placed on the mount, dorsal side up, with its longitudinal axis parallel to the E vector. It was moistened with frog Ringer solution, and its condition evaluated by an ECG displayed on an oscilloscope. After ascertaining that the beat rate was stable, the experimental sequence was initiated.

The UHF power density was measured between experimental runs with a quarter wave dipole connected in series with a Hewlett-Packard model 477B thermister mount and a Hewlett-Packard model 430C power meter. This measurement assembly is one of the few that is not grossly inaccurate at UHF [8]. The peak power density used was 60 mw/cm^2. At the rate of one 10 μsec pulse/sec the average power density was negligible, i.e., 0.6 microwatts/cm^2. Due to the fact that the preparation and even the dipole measuring instrument disturb a UHF field, measurements of power density are considered to have order of magnitude accuracy.

Results

When the heart was illuminated 200 msec after the P wave, about the time the QRS complex occurred in our experimental situation, the beat rate increased. This increase was statistically significant at the .01 level (The two tailed Wilcoxon matched-pairs signed-rank test was used. Heart arrhythmia or cessation during illumination after rate increase was considered the extreme of rate increase). In half the cases, arrhythmias occurred and they were associated with illumination. On occasion, the heart ceased after a period of arrhythmia. These data are shown in Table 1.

It could be argued from the remaining data that illumination at the occurrence of the P wave or 100 msec after it also effected heart rate. The investigators, though, consider the data on the 0 delay and 100 msec delay to be inconclusive. If an effect exists, it requires more than a small number of preparations to tease it out and to reach statistical significance.

The results of the control sessions in which the possibility was tested

TABLE 1

Relative change of beat rate in isolated frog hearts (arbitrary units) observed during periods of UHF illumination (circled) and nonillumination. The UHF energy illuminating pulses occurred 200 msec after the ECG P wave. Comparisons should be made across the table. The comparisons are between circled and noncircled data with heart arrhythmia (ARR) and cessation (CES) considered the extreme of increase. Note that on some occasions the heart could not recover from arrhythmia after the UHF energy was turned off.

Heart	Recording period		
	I	II	III
A	20	(ARR)	ARR
B	(67)	18	(33)
C	17	(67)	8
D	(25)	22	(67)
E	18	(ARR)	CES
F	(ARR)	15	(ARR)
G	20	(ARR)	CES
H	7	(20)	12

that induced currents on the electrodes caused the effect, indicate that the effect can not be attributed to induced currents. This possibility was explored even to the point of using, at the same time, voltages 10^2 higher and 10^3 longer than the maximum that the UHF energy induced on the electrodes.

The results of the control sessions for determining if illumination with UHF energy is necessary to induce the effect, indicate that illumination is necessary. When echosorb shielding was interposed between the antenna and preparation, no effect appeared.

Discussion

This report was written in order to bring this phenomena to the attention of investigators interested in the cardiovascular system. It is a limited extension of our work on the CNS. The result should be considered to be specific to this particular experimental situation. The only conclusion that is warranted,

is that this data, considered with the data cited in the introduction, provide reason for a more complete investigation of the effect of modulated UHF energy on the heart. Such a complete investigation may well show that this energy can be a useful tool in the study of cardiac function.

Summary

Recent reports indicate that illumination with UHF energy affects the heart and CNS. Isolated frog hearts were illuminated with pulse modulated UHF energy in this investigation. The pulses were synchronized with the ECG in an attempt to induce a positive feedback condition. Statistically significant changes in heart rhythm were associated with the UHF illumination. It was concluded that more extensive investigations are warranted.

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