

Contaminant Exposure and Effects Terrestrial Vertebrates Database: Analysis for the Northeast



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INTRODUCTION

Over the past 5 years a “Contaminant Exposure and Effects—Terrestrial Vertebrates” database (CEE-TV) focused on coastal and estuarine habitat in the United States has been compiled through computerized search of published literature, review of existing databases, and solicitation of unpublished reports from conservation agencies, private groups, and universities. The database, a product of the Biomonitoring of Environmental Status and Trends program, is designed to help evaluate the threat of contaminants and other anthropogenic activities to terrestrial vertebrates residing in or near Atlantic, Pacific, and Gulf coast estuaries, and the Great Lakes. The CEE-TV database is web accessible (www.pwrc.usgs.gov/ceetv) in an easy to use searchable format. The database has a number of potential applications, including focusing biomonitoring efforts to generate critically needed ecotoxicological data in the numerous “gaps” along the coast, reducing uncertainty about contaminant risk, identifying areas for mitigation, restoration or special management, and ranking the ecological conditions of estuaries.

OBJECTIVES

1. Summarize information on contaminant exposure and effects in terrestrial vertebrates residing in or near Atlantic estuarine and coastal ecosystems.
2. Conduct a preliminary risk assessment of contaminant threats to terrestrial vertebrates at selected Atlantic estuarine and coastal sites to rank ecosystem health and identify critical data gaps.

METHODS

- Data were obtained through computerized literature searches, solicitation of unpublished agency reports, and search of existing institutional databases
- Information including site and year of study, species studied, biological matrix analyzed, contaminant concentration, biomarker response, and data source were entered into a 120-field database.
- Spatial analysis was completed to identify National Wildlife Refuges, National Parks and watersheds of potential concern that do not have recent terrestrial vertebrate ecotoxicological data

RESULTS

Summary Information

Total number of records: 11,085
Individuals per record: 1 to 37,590
Total number of individual animals: >330,000
Total number of species represented: 420
76.3% Birds
19.5% Mammals
3.9% Reptiles
0.3% Amphibians
Sample matrices studied: 49

Geographic Distribution of Records

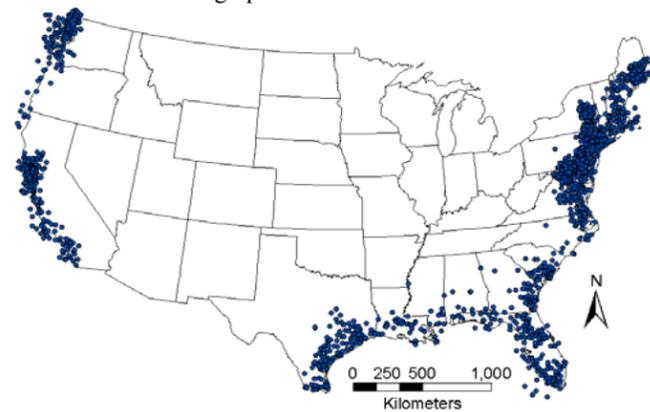
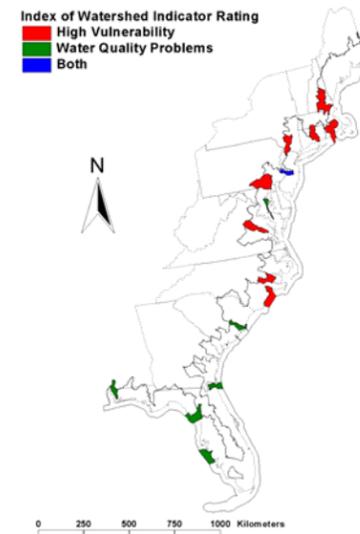


Table 1. Watersheds of potential concern with no recent terrestrial vertebrate ecotoxicological data in the Northeast Atlantic states

Watershed Name	State	Historic CEE-TV Records (1965-1989)
<i>Watersheds categorized as having “better water quality” or “less serious water quality problems”, with “high vulnerability” to pollution</i>		
Merrimack River	NH/MA	5
Long Island Sound (Connecticut River)	MA/CT	13
Narragansett Bay	MA/RI	13
Hudson River/Raritan Bay	NY/NJ	0
Chesapeake Bay (Susquehanna River)	PA/MD	0
Chesapeake Bay (York River)	VA	0
<i>Watersheds categorized as having “more serious water quality problems” with “low vulnerability” to pollution</i>		
Chesapeake Bay (Severn/Patuxent Rivers)	MD	74
<i>Watersheds categorized as having “more serious water quality problems” and “high vulnerability” to pollution</i>		
Delaware Bay (Middle Delaware River)	PA/NJ	0

Fifteen watersheds having “more serious water quality problems” or “high vulnerability” that lack CEE-TV data for 1990 through 2000



Number of Records for Northeastern States

Maine: 249
New Hampshire: 30
Massachusetts: 176
Rhode Island: 40
Connecticut: 99
New York: 1,035
New Jersey: 450
Pennsylvania: 54
Delaware: 179
Maryland: 482
Virginia: 386

Table 2. National Parks in watersheds of potential concern with no recent terrestrial vertebrate ecotoxicological data

Park Name	State	Park Area (km ²)	% of Park in Watershed	Historical CEE-TV Records (1965-1989)
<i>Parks in watersheds categorized as having “better water quality” or “less serious water quality problems”, with “high vulnerability” to pollution</i>				
Minute Man NHP (Central Portion)	MA	3.7	64	0
Home of Franklin D. Roosevelt NHS	NY	1.2	100	0
Hopewell Furnace NHS	PA	3.4	100	0
Assateague Island NS	MD	227.9	100	0
Greenbelt Park	MD	4.2	100	0
National Capital Parks - East (Western Portion)	MD/DC	30.4	100	3
Chesapeake and Ohio Canal NHP (Eastern Portion)	MD/DC	82.6	2	0
Manassas NBP	VA	20.4	100	0
Green Springs NHL	VA	62.5	100	0
Richmond NBP	VA	3.3	100	0
<i>Parks in watersheds categorized as having “more serious water quality problems” and “high vulnerability” to pollution</i>				
Minute Man NHP (Eastern Portion)	MA	3.7	3	0
Morristown NHP	NJ	6.9	100	0

*Only National Parks with > 1 km² area were included in this analysis. National Battlefield Park, NBP; National Historic Landmark District, NHL; National Historic Park, NHP; National Historic Site, NHS; National Preserve, NPR; National Seashore, NS.

Table 3. National Wildlife Refuges in watersheds of potential concern with no recent terrestrial vertebrate ecotoxicological data

Refuge Name	State	Refuge Area (km ²)	% of Refuge in Watershed	Historic CEE-TV Records (1965-1989)
<i>Refuges in watersheds categorized as having “better water quality” or “less serious water quality problems”, with “high vulnerability” to pollution</i>				
Rachel Carson (Northern Portion)	ME	24.4	10	0
Rachel Carson (Southern Portion)	ME	24.4	90	0
Great Bay	NH	4.3	100	0
Massasoit	MA	0.7	100	0
Mashpee	MA	27.6	100	0
Monomoy	MA	8.4	100	8
Nantucket	MA	0.1	100	0
Nomans Land Island	MA	2.5	100	0
Sachuest Point	RI	1.0	100	0
Pettaquamscutt Cove	RI	3.4	86	0
Target Rock	NY	0.3	100	0
Elizabeth A. Morton	NY	0.7	100	0
Conscience Point	NY	0.2	100	0
Seatuck	NY	0.9	100	0
Lido Beach Wildlife Management Area	NY	0.1	100	0
John Heinz at Tinicum	PA	4.4	100	12
Bombay Hook	DE	54.1	100	0
Prime Hook	DE	60.3	100	9
E B Forsythe (Brigantine Division, Southern Portion)	NJ	114.9	51	1
Cape May (Great Cedar Swamp Unit, Northern Portion)	NJ	36.6	65	0
Susquehanna	MD	32.6	32	0
Martin	MD	13.3	100	1
Chincoteague (Chincoteague Unit)	MD/VA	38.3	100	0
Wallops Island	VA	9.9	100	0
Mason Neck	VA	9.3	100	0
Marumco	VA	0.3	100	0
Featherstone	VA	1.3	100	0
Presquile	VA	5.2	100	0
James River	VA	17.6	100	0
Nansemond	VA	0.8	100	0
Great Dismal Swamp (Northern Portion)	VA	458.1	9	0
Back Bay	VA	63.7	100	0
<i>Refuges in watersheds categorized as having “more serious water quality problems” with “low vulnerability” to pollution</i>				
Stewart B. McKinney (Salt Meadow)	CT	0.7	100	0
Stewart B. McKinney (Falkner’s Island)	CT	0.1	100	0
Stewart B. McKinney (Outer Island)	CT	<0.1	100	0
Susquehanna	MD	32.6	68	0
<i>Refuges in watersheds categorized as having “more serious water quality problems” and “high vulnerability” to pollution</i>				
Thacher Island	MA	<0.1	100	0
Cape May (Great Cedar Swamp Unit, Southern Portion)	NJ	36.6	35	0
Killehook	NJ	2.5	100	1
E B Forsythe (Brigantine Division, Northern Portion)	NJ	114.9	49	0

CONCLUSIONS

- One watershed, a drainage basin of the Middle Delaware River in Pennsylvania and New Jersey, was categorized as having both “more serious water quality problems” and “high vulnerability”
- There are two National Parks in the northeast states that do not have any historical CEE-TV records and are located in watersheds categorized as having “more serious water quality problems” and “high vulnerability”
- There are four National Wildlife Refuges that have few historical CEE-TV records and are located in watersheds categorized as having “more serious water quality problems” and “high vulnerability”
- GIS software can facilitate the use of the CEE-TV database as a decision support tool for scientists and natural resource managers by identifying potentially significant terrestrial vertebrate data gaps