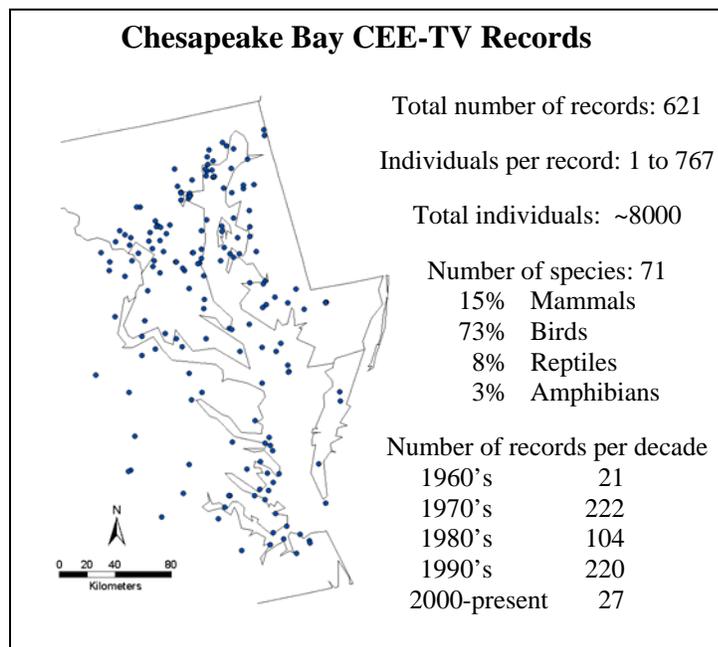


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## Wildlife Toxicology Information and Data Gaps for Terrestrial Vertebrates in Chesapeake Bay

The Chesapeake Bay Program is attempting to assess the status of aquatic-dependent living resources in the Bay to toxics. To meet this objective, the program has been conducting a toxics characterization of the tidal river systems. The USGS has evaluated data on contaminant effects in wildlife to compliment this Chesapeake Bay Program effort and to meet Department of the Interior partner needs related to understanding the factors affecting health of wildlife in the Bay watershed. The Contaminant Exposure and Effects--Terrestrial Vertebrates (CEE-TV) database summarizes ecotoxicological data for terrestrial vertebrates inhabiting estuarine and coastal habitat along the Atlantic, Gulf, and Pacific coasts, Alaska, Hawaii, and in the Great Lakes. Data is compiled from published literature and unpublished sources, including reports from conservation agencies, private groups, and universities. Summary information includes contaminant exposure, biomarker responses, and adverse effects on reproduction and survival, that can be queried by taxonomic, spatial, and temporal fields.



## METALS and TRACE ELEMENTS

### Lead

- Of 108 records that document lead exposure in waterfowl from 1972-1995, 27 reached levels indicative of subclinical or clinical poisoning
- However, since the ban on the use of lead shot for hunting waterfowl, only 13 records contain data on lead in waterfowl, 5 of which are indicative of lead poisoning
  - No information on diving ducks for this period, despite the high susceptibility of these birds to poisoning from lead shot
  - No data examining rates of lead shot ingestion following its ban

### Mercury

- Of 37 records (1973-2001) in eggs of fish-eating birds, none were above the 1 ug/g threshold for adverse effects
- Of 48 records (1971-1994) in liver and kidney of reptiles, birds, and mammals, the highest values were 8.8 and 1.3 ug/g, well below the 20-30 ug/g threshold for adverse effects

### Selenium

- Of 45 records (1973-1998), 11 contained selenium values above the threshold in which toxicity may occur, however all of these records were for waterfowl wintering, and not breeding, in Chesapeake Bay

### Cadmium

- Of 168 records (1972-1995) of reptiles, birds, and mammals, none approached levels associated with toxicity

## CONTAMINANTS OCCURENCE:

- Data exist for 76 different contaminants in terrestrial vertebrates in the Chesapeake Bay, which is <0.1% of total chemicals in U.S. commerce.
- The percentage of records that contain information on the following contaminants is as follows:
 

DDE, DDD and DDT	42%
Ah-receptor active PCB Congeners	1%
Mercury	25%
Lead	44%
Biomarker/bioindicator Responses	15%

## PESTICIDES AND ORGANIC CONTAMINANTS

### DDE

- DDE concentrations in eggs of fish-eating birds have decreased steadily since the ban of DDT
- Eggshell thinning, which reached mean levels of 26% in the 1970's, has not been evidenced overall in the 1990's to present, though individual values in osprey eggs in 2000 were thinned by up to 10%

### PCBs

- PCB concentrations have decreased in eggs of fish-eating birds, though at a slower rate than DDE.
- Limited data exist on PCB congener exposure (only for black-crowned night-heron and osprey eggs).

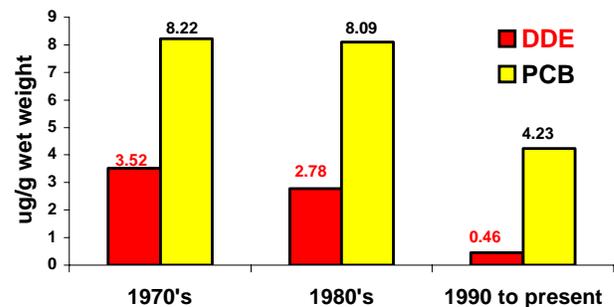
### Dioxins and Dibenzofurans

- No information exists for these highly toxic compounds in terrestrial vertebrates.

### Cholinesterase-Inhibiting Pesticides

- Though several die-offs had previously been reported, only one record contains information on organophosphorus insecticide or carbamate exposure in terrestrial vertebrates since 1993.

### DDE and PCB in Eggs of Fish-Eating Birds in the Chesapeake Bay



### Rodenticides

- Little data (1 record only) on exposure to these compounds.

### Emerging Contaminants

- Detectable quantities of brominated diphenyl ethers, nonylphenol, and perfluorinated compounds were found in osprey eggs collected in 2000 and 2001. There are many sources of these contaminants (e.g., sewage outfalls), but concentrations in biota appear to be below adverse effect levels.

### Data Gaps and Management Implications

- Despite its ban for hunting in wetlands, lead shot continues to appear in the gizzard of waterfowl in other regions. The effect of the lead shot ban has not yet been assessed for the Chesapeake Bay.
- Based on CEETV exposure data, mercury does not currently appear to be posing a threat to terrestrial vertebrates in Chesapeake Bay. However, mercury methylation may be occurring at significant rates in smaller bodies of water within the bay, necessitating its continued monitoring.
- DDE and PCBs have steadily declined since restrictions on their use. However, high levels of these compounds and related effects can still be found in highly contaminated regions.
- Exposure to dioxins and dibenzofurans, cholinesterase-inhibiting pesticides, and rodenticides has not been adequately assessed for terrestrial vertebrates in Chesapeake Bay.
- Limited data exist for reptiles and amphibians inhabiting coastal areas of the United States, including Chesapeake Bay.
- Several national parks and refuges within the Chesapeake Bay watershed lack terrestrial vertebrate ecotoxicological data.
- Compared to other estuaries in the United States, contaminant exposure and effects in Chesapeake Bay terrestrial vertebrate range from moderate to potentially significant.