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## Environmental Contaminant Risks to Avian Species at Important Bird Areas in the Northeastern United States

Environmental contaminants from agricultural, industrial and urban activities can have profound effects upon birds, acting at the molecular through population levels of biological organization. In 1995, the American Bird Conservancy initiated the Important Bird Area (IBA) program to identify and document significant bird areas throughout the U.S, and heighten the awareness of the public and land managers about the need to protect these areas. Even though most IBAs have a protected status, there are pollution issues and pesticide use on and adjacent to some of these sites that may threaten birds. A screening level risk assessment of contaminant threats and exposure data for avian species residing in the 52 IBAs of the northeastern Atlantic coastal drainage was undertaken in order to identify sites in need of additional contaminant biomonitoring and possibly special management.

Using geographic information system methodology, boundary shapefiles were obtained or produced for the 52 IBAs. Included in the area examined at each site was a buffer around each IBA to account for boundary imprecision and small daily sojourns by birds outside of the IBA, where they might be exposed. Several well-characterized data layers that may integrate contaminant hazards and risk were identified and overlaid on these shapefiles for each site. Contaminant threat for each site was ranked using a semi-quantitative classification scheme according to the (1) percentage of streams designated as impaired by contaminants, (2) severity of fish and wildlife consumption advisories, (3) number of TRI sites and quantity of compounds released to air, surface water and/or

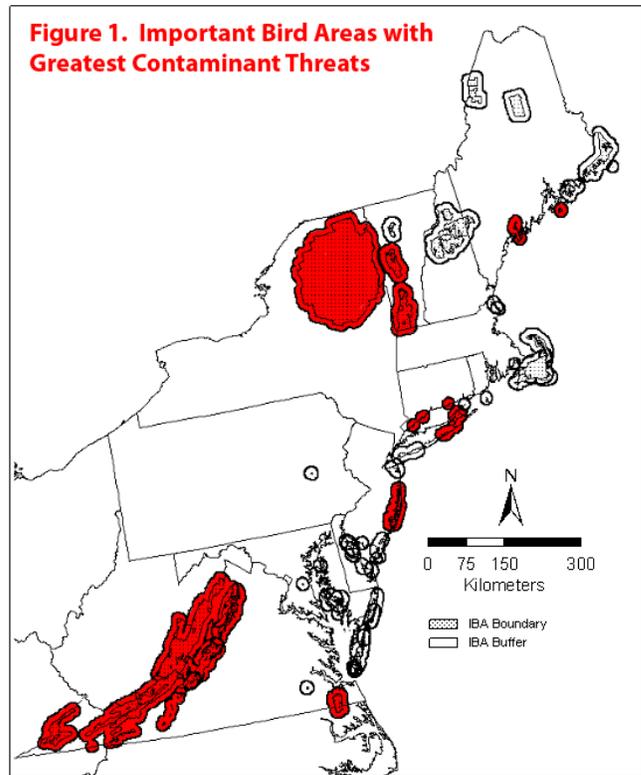


land, and (4) estimated pesticide use and toxicity of the compounds to birds. For each of these 4 potential threat categories, sites were ranked (1 = high rank and presumably great threat versus 52 = low rank and presumably low threat), and the category ranks were summed to derive a final rank order (contaminant threat rank).

Birds residing at the Jefferson National Forest (NF), Stewart B. McKinney National Wildlife Refuge (NWR), Great Dismal Swamp NWR, Blue Ridge Parkway, Shenandoah National Park (NP), Adirondack Park, Edwin B. Forsythe NWR, George Washington NF, Green Mountain NF, Long Island Piping Plover Beaches, and Merrymeeting Bay (Figure 1, Table 1) may be significantly threatened by environmental contaminants. These sites accounted for over 50% of the study area, exhibited moderate to high percentages of impaired waters, fish consumption advisories related to mercury and PCBs, and were located in counties with substantial application rates of pesticides known to be toxic to birds. Avian species at these IBAs include the Federally endangered roseate tern (*Sterna dougallii*), threatened piping plover (*Charadrius melodus*),

neotropical migrants, Bicknell's thrush (*Catharus bicknelli*), Swainson's warbler (*Limnothlypis swainsonii*), and wintering brant geese (*Branta bernicla*).

To calibrate the relative contaminant threat for the sites, the Contaminant Exposure and Effects-Terrestrial Vertebrates database was searched for information on birds examined within the boundaries of each site. For a moderate number of sites, there was qualitative concordance between the perceived risk and actual exposure or adverse effects reported in birds. However, several of the sites with apparently substantial contaminant threats (e.g., George Washington NF, Shenandoah NP) had no avian ecotoxicological data. Based upon this screening level risk assessment, contaminant biomonitoring is warranted at such sites to evaluate this potential risk to birds, and data generated from such efforts should foster natural resource management activities.



**Table 1. Contaminant Threat Matrix for Most Threatened and Least Threatened Important Bird Areas and their Buffers in the Northeastern Atlantic Coastal Drainage**

Contaminant Threat Rank	Important Bird Area Name	% Waters Impaired		Fish or Wildlife Consumption Advisory			Toxic Release Inventory Sites		Compounds Released at Toxic Release Inventory Sites			County Pesticide Use		
		%	Rank	No Consumption	Restricted Consumption	Rank	TRI Sites	Rank	Number Released	Pounds Released (2000-04)	Rank	Compounds Suspected to be Toxic to Birds	Pounds Applied (2002)	Rank
1	Jefferson NF	1.31	12	12	10	6	77	13	68	3988 x 10 <sup>4</sup>	6	32	89 x 10 <sup>3</sup>	1
2	Stewart B. McKinney NWR	32.20	1	4	5	18.5	41	1	53	347 x 10 <sup>4</sup>	4	17	4.9 x 10 <sup>3</sup>	15
3	Great Dismal Swamp NWR	12.65	5	3	3	27.5	19	7	50	1835 x 10 <sup>4</sup>	1	30	274 x 10 <sup>3</sup>	6
4	Blue Ridge Parkway	3.48	8	6	5	14.5	27	10	46	302 x 10 <sup>4</sup>	13	27	76 x 10 <sup>3</sup>	3
5	Shenandoah NP	23.62	2	4	3	23	13	17	53	375 x 10 <sup>4</sup>	10	24	113 x 10 <sup>3</sup>	5
6	Adirondack Park	3.45	9	41	38	1	29	29	43	958 x 10 <sup>4</sup>	16	30	46 x 10 <sup>3</sup>	4
7	Edwin B. Forsythe NWR	1.31	11	7	8	9	11	15	12	75 x 10 <sup>4</sup>	18	27	81 x 10 <sup>3</sup>	8
8	George Washington NF	0.12	18	6	6	11.5	28	23	67	3399 x 10 <sup>4</sup>	7	28	186 x 10 <sup>3</sup>	2
9	Green Mountain NF	4.63	7	15	13	4	12	22	19	12 x 10 <sup>4</sup>	27	27	17 x 10 <sup>2</sup>	7
10.5	Long Island Piping Plover Beaches	0.20	17	20	17	2	42	6	45	120 x 10 <sup>4</sup>	17	26	19 x 10 <sup>3</sup>	32
10.5	Merrymeeting Bay	0.74	13	8	7	8	7	11	14	24 x 10 <sup>4</sup>	21	18	8.3 x 10 <sup>3</sup>	21
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42	Nantuket	0	35.5	7	4	11.5	0	44.5	0	0	44.5	0	0	51.5
43	Eastern Neck NWR	0	35.5	0	3	42	0	44.5	0	0	44.5	25	62 x 10 <sup>3</sup>	26
44	Mount Mansfield SF	0.37	14	0	1	47	0	44.5	0	0	44.5	8	0.9 x 10 <sup>3</sup>	43
46	Eastern Shore of VA NWR	0	35.5	1	1	42	0	44.5	0	0	44.5	21	19 x 10 <sup>3</sup>	36
46	Glenn Martin NWR	0	35.5	0	1	47	0	44.5	0	0	44.5	20	19 x 10 <sup>3</sup>	31
46	Kiptokeke SP	0	35.5	1	1	42	0	44.5	0	0	44.5	21	19 x 10 <sup>3</sup>	36
48.5	Monomoy NWR	0	35.5	3	0	33.5	0	44.5	0	0	44.5	15	17 x 10 <sup>3</sup>	45
48.5	South Chatham Beach	0	35.5	3	0	33.5	0	44.5	0	0	44.5	15	17 x 10 <sup>3</sup>	45
50	Machias Seal Island	0	35.5	3	3	27.5	0	44.5	0	0	44.5	0	0	51.5
51	Fisherman Island NWR	0	35.5	0	0	50.5	0	44.5	0	0	44.5	21	19 x 10 <sup>3</sup>	36
52	Cape Henlopen SP	0	35.5	0	0	50.5	0	44.5	0	0	44.5	17	71 x 10 <sup>3</sup>	39