Waterbird Mortality in New York Waters of Lakes Erie and Ontario Resulting from Type E Botulism

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Botulism Observed in a Gull Colony

- The Bethlehem Steel gull colony near Buffalo contains approximately 10,000 pairs of nesting Ring-billed gulls.
- During a July 5, 2002 inspection of the colony, 946 dead gulls (adults and chicks) were counted.
- The following week approximately 3,000 dead gulls were observed.
- Type E botulism was diagnosed and mudpuppies were found in gull stomachs.

Lake Erie Botulism Mortality Surveys 100m Transect Survey Results by NYSDEC 10/15/02 – 1/09/03 Table 1, Section 1

Species	Predicted Mortality	Upper Conf.	Lower Conf.
Common Loon	2,042	3,447	637
Horned Grebe	273	482	64
Red Necked Grebe	36	84	0

Lake Erie Botulism Mortality Surveys 100m Transect Survey Results by NYSDEC 10/15/02 – 1/09/03 Table 1, Section 2

Species	Predicted Mortality	Upper Conf.	Lower Conf.
Wood Duck	18	54	0
Greater Scaup	128	213	43
Long-tailed Duck	12,616	20,808	4,424
Scoter	18	54	0
C. Merganser	18	54	0
R-b Merganser	839	1,405	273
Unidentified Merg.	383	649	117
Unidentified Duck	36	108	0

Lake Erie Botulism Mortality Surveys 100m Transect Survey Results by NYSDEC 10/15/02 – 1/09/03 Table 1, Section 3

Species	Predicted Mortality	Upper Conf.	Lower Conf.
Bonaparte's Gull	18	54	0
Ring-billed Gull	273	429	117
Herring Gull	474	767	181
Gr. Black-bkd. Gull	36	84	0
Unidentified Gull	91	203	0
TOTAL BIRDS*	17,301	27,566	7,036

* Total from Table 1, sections 1, 2 & 3

Lake Erie Waterbird Mortality New York Botulism Transect Survey Results

	2000	2001	2002
Common Loon	583	1,149	2,042
Horned Grebe	109	0	273
Long-tailed Duck	0	310	12,616
Red-breasted Merganser	2,479	91	839
Ring-billed Gull	1,714	510	273
TOTAL BIRDS	5,415	2,862	17,301

Lake Ontario Botulism Mortality Survey 100 M Transect Survey Results NYSDEC 2002

Species	Predicted Mortality	Upper Limit	Lower Limit
		95% Confidence	95% Confidence
Long-tailed Duck	675	1,336	0
Herring Gull	80	83	0
Ring-billed Gull	129	251	7
Greater Black-backed Gull	32	76	0
Double-crested Cormorant	32	76	0
Unknown Duck	16	48	0
Unknown Gull	64	25	3
Misc Unknown	16	48	0
TOTAL BIRDS	1,046	1,924	168



Niagara County Botulism Mortality Survey 100 M Transect Survey Results NYS DEC 2002

Species	Predicted Mortality	Upper Limit 95% Confidence	Lower limit 95% Confidence
Long-tailed Duck	700	1,169	231
Unknown Duck	17	50	0
Ring-billed Gull	100	201	0
Herring Gull	67	164	0
Greater Black-backed Gull	17	50	0
Unknown Gull	17	50	0
Double-crested Cormorant	17	50	0
Misc. Unknown	17	50	0
TOTAL BIRDS	950	1,565	335

2002 in Summary

- Significant mortality observed at Bethlehem Steel gull colony.
- Loon, long-tailed duck and total bird mortality increased in Lake Erie.
- Botulism-caused mortality observed in gulls and long-tailed ducks in Lake Ontario.

Long-Term Assessments of Warmwater Fish Stocks and Characteristics of Fish Kill Events in NY's Portion of Lake Erie

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Common fish kills observed in eastern Lake Erie through the years

- March-April, Alewife & Gizzard Shad temperature stress
- May-June Smelt *Glugea* and spawning
- June-July Smallmouth Bass spawning & upwellings?
- June-August Warmwater Fish upwellings











































Smallmouth Bass Diets from Annual September Sampling

Year		Percent of stomachs with selected prey			
	Sample (n)	<u>crayfish</u>	<u>clupeids</u>	<u>smelt</u>	<u>goby</u>
1985 - 87	173	23.7 %	9.8 %	4.6 %	0.0 % Prior to Goby presence
1999	80	11.3 %	15.0 %	10.0 %	42.5 %
2000	170	4.1 %	1.2 %	2.4 %	89.4 %
2001	58	1.7 %	1.7 %	6.9 %	58.6 %
2002	22	13.6 %	4.5 %	0.0 %	81.8 %





NYS DEC - Lake Erie Unit Research Partnerships

- NYS DEC Wildlife Pathology Unit
- Cornell University Aquatic Animal Health Program
- SUNY Fredonia Biology Department

Questions?

- Where is the anaerobic environment in eastern Lake Erie?
- Some benthic fish species are conspicuous by their absence in fish kills, ex. suckers, yellow perch?
- We have experienced abundant mussel densities for over a decade, but botulism only recently?