

# *Common Loons as a Biological Indicator of Mercury Pollution*



**Dr. N. Schoch, Adirondack Cooperative Loon Program**

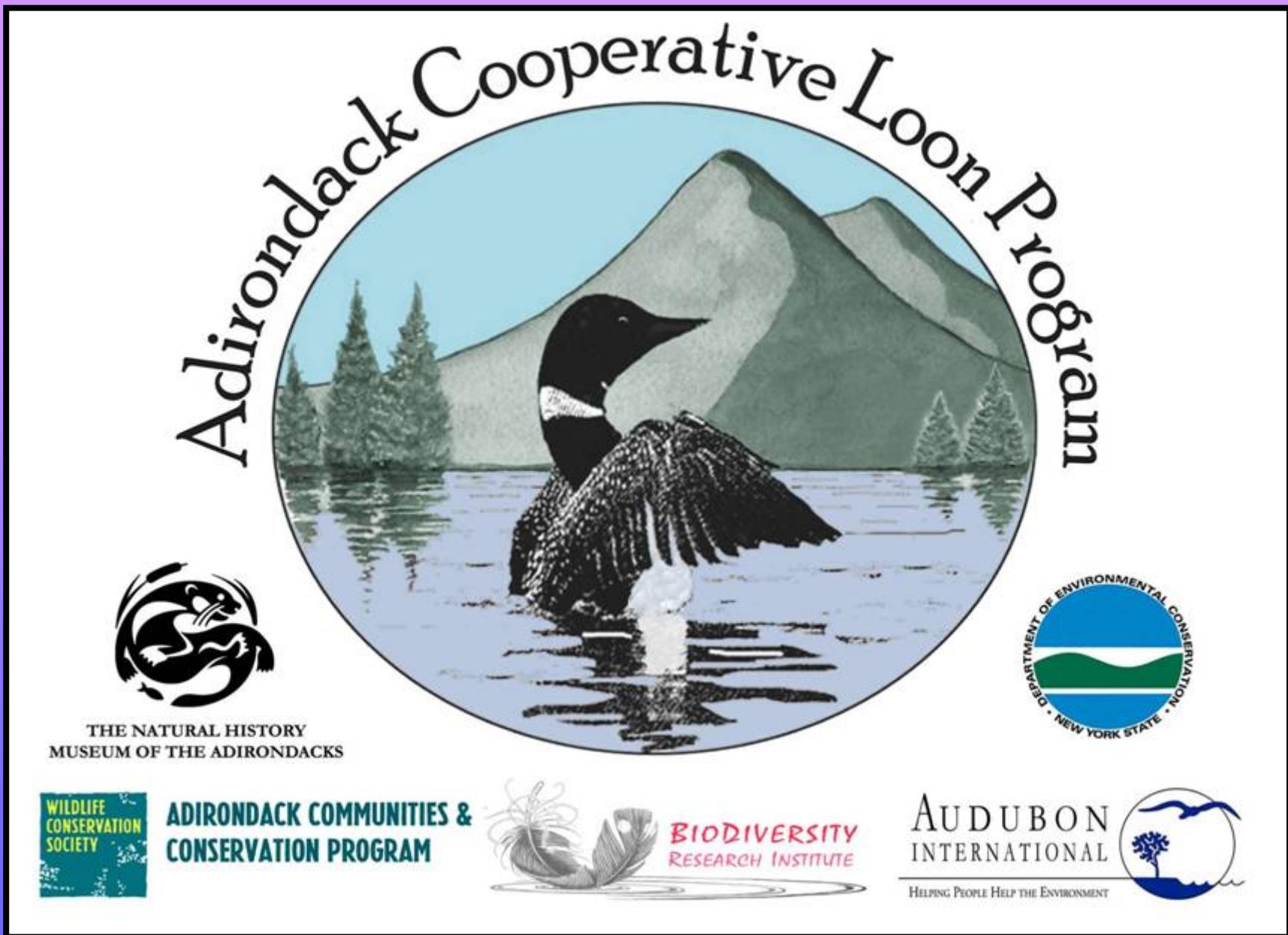
**Dr. David Evers and Melissa Duron, BioDiversity Research Institute**

**Dr. Michale Glennon, Wildlife Conservation Society**

**Howard Simonin, Bureau of Habitat, NYS Dept. of Environmental Conservation**

**Dr. Charles Driscoll, Dept. of Civil and Environmental Engineering, Syracuse Univ**

**John Ozard, Bureau of Wildlife, NYS Dept. of Environmental Conservation**



# *Why Study Loons?*



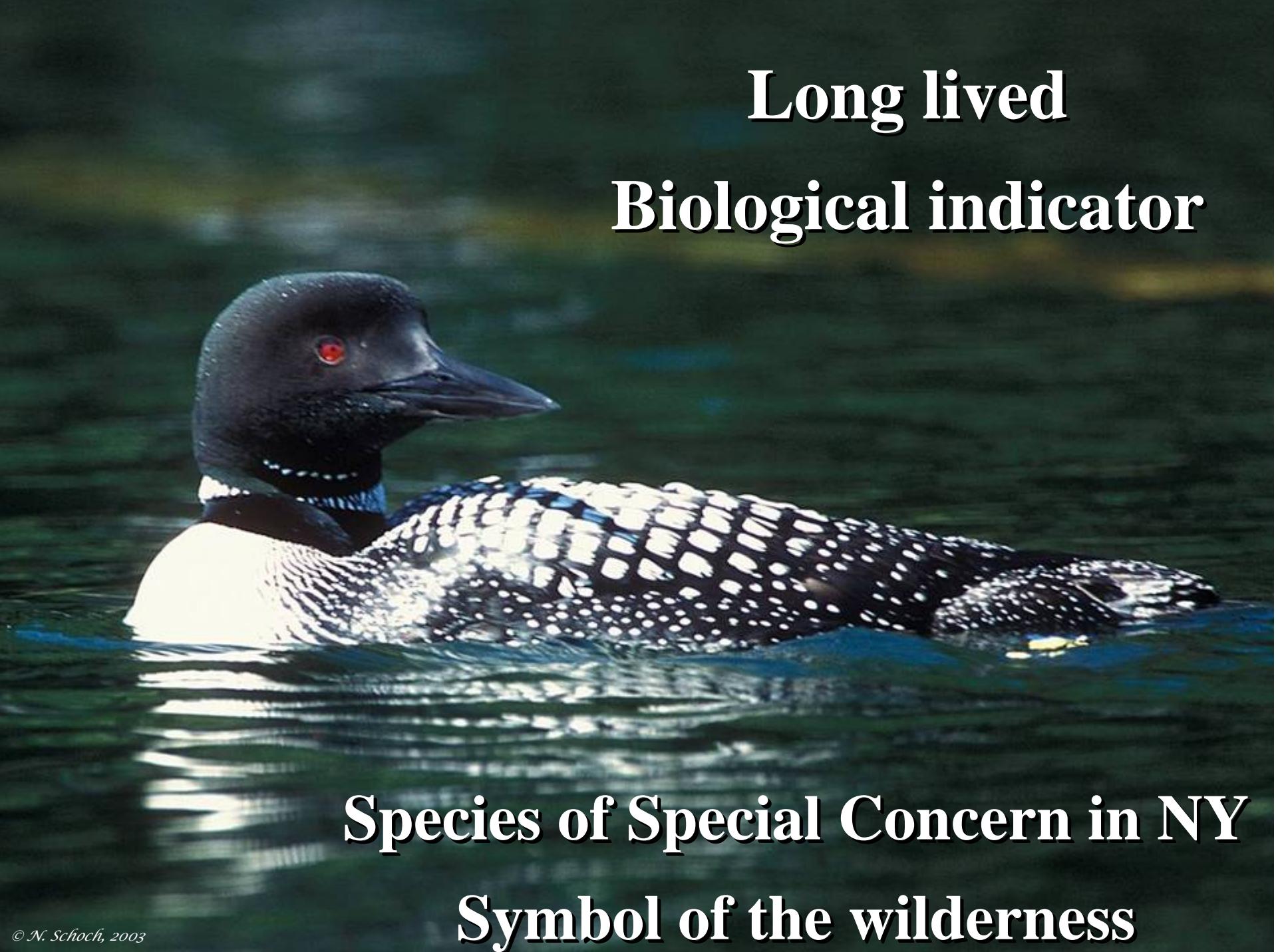
**High on food chain**

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# Territorial

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A close-up photograph of a Common Loon swimming on dark, rippled water. The loon's head is dark with a prominent red eye and a long, hooked beak. Its body is covered in dark feathers with white spots on the wings and back. The water reflects the surrounding environment.

# **Long lived Biological indicator**

**Species of Special Concern in NY  
Symbol of the wilderness**

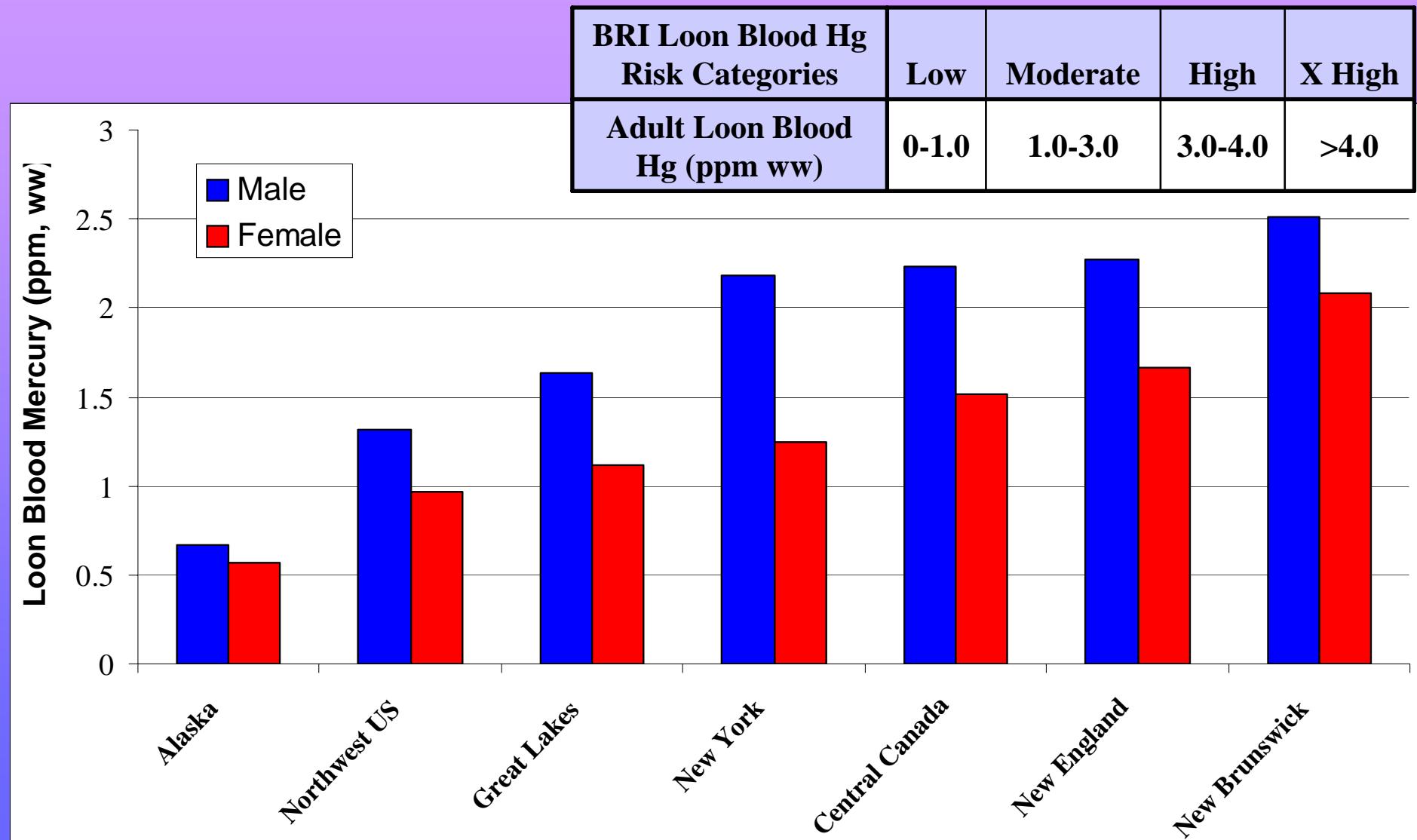
# *Threats Affecting Loons and Their Habitats*

- Mercury pollution
- Acid deposition
- Water level fluctuations
- Lead poisoning from fishing tackle ingestion
- Fishing line entanglement
- Disturbance of nests and chicks
- Shoreline development
- Wildlife predators
- Catastrophic events: botulism, oil spills

# *Mercury – the Insidious Toxin*

- Methylmercury
- Bioaccumulation
- Males vs. females
- Adult behavior
- Chicks
- Reproductive success

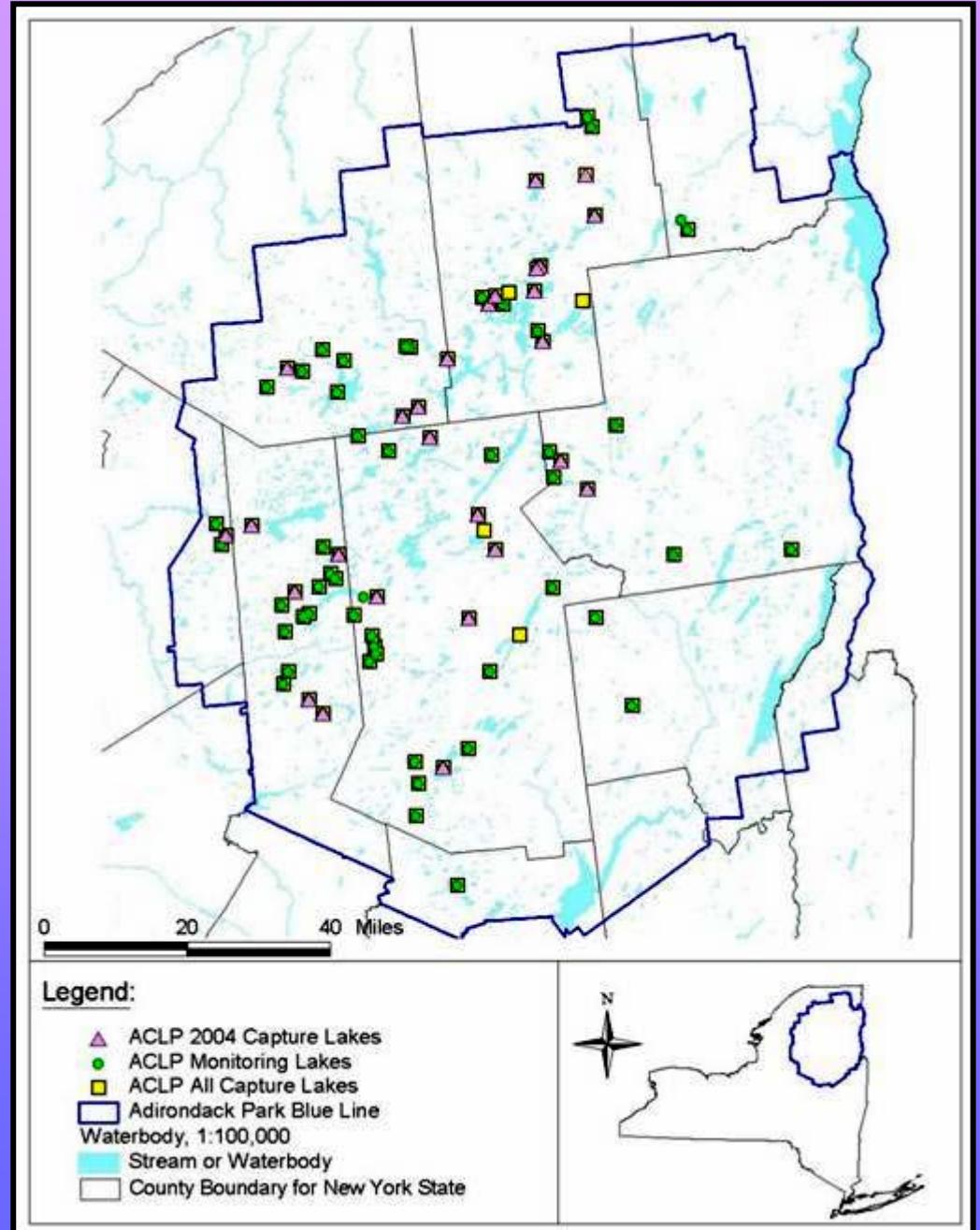
# *Trend of Loon Mercury Levels*



# *ACLP's Loon Mercury Research*



J. Ozard-NYS DEC, 2001



# *Mercury Hazard Profile*



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# *Loon Capture and Banding*



## Nightlighting and playback techniques

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FWS aluminum &  
colored bands for  
individual  
identification



# Body measurements

J. Ozard-NYS DEC, 2001

# Body weight

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# Sample collection



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K. Poppe, 2001

# Release!



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# *Monitor Reproductive Success*





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Breed on northern lakes

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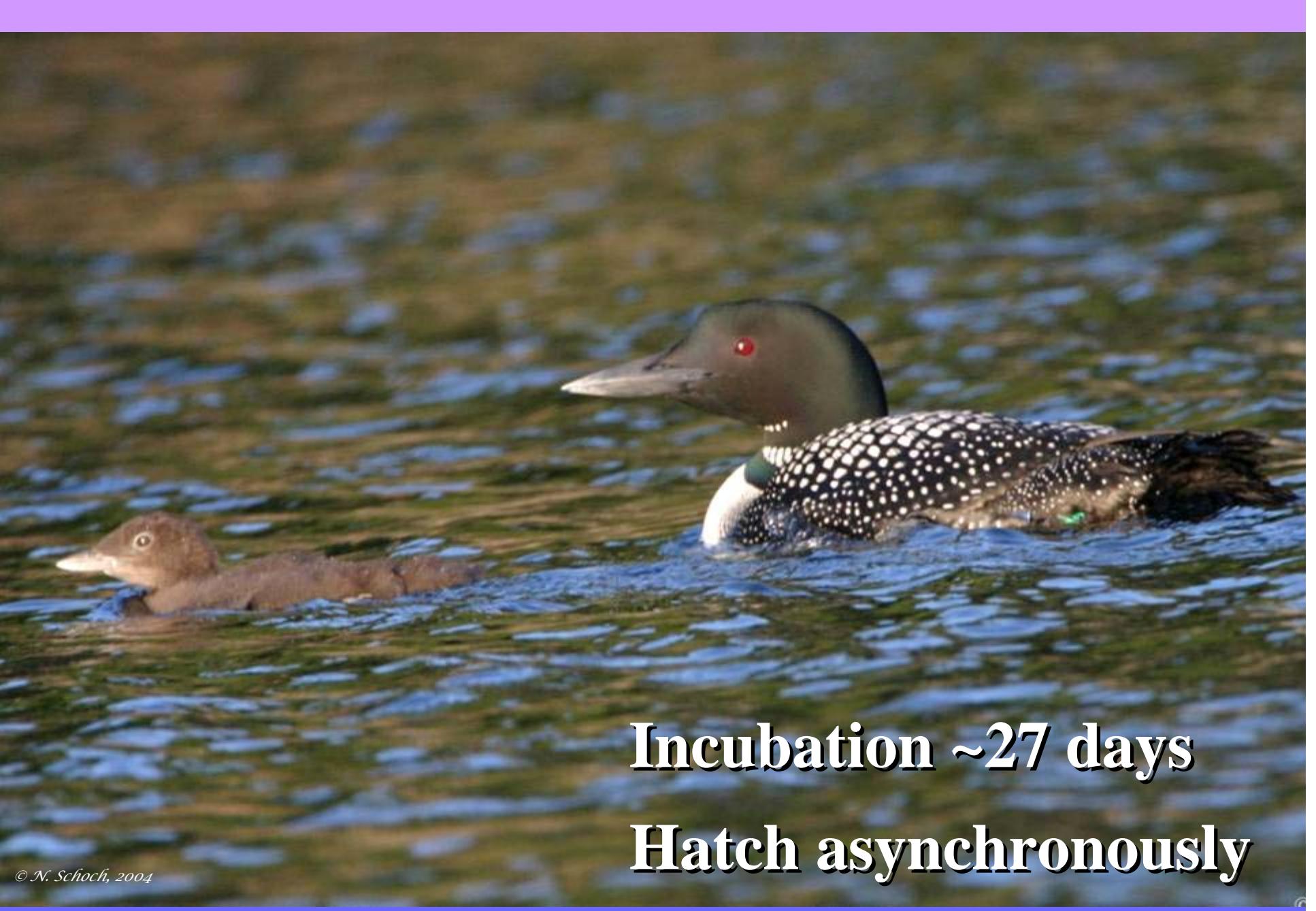
Nest on island shoreline  
or bog mats

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Lay 1-3 eggs

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**Incubation ~27 days  
Hatch asynchronously**



Young fledge at ~11 weeks

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# *Preliminary Results: Loon Blood Mercury Levels*



Age	Sex	# Loons	Avg Hg (ppm)	Std Dev Hg (ppm)	Min Hg (ppm)	Max Hg (ppm)
Adult	Total	48	1.78	1.17	0.43	5.87
	Female	24	1.53	1.24	0.43	5.87
	Male	24	2.03	1.06	0.62	3.85
Juvenile	Unknown	35	0.26	0.19	0.06	0.82

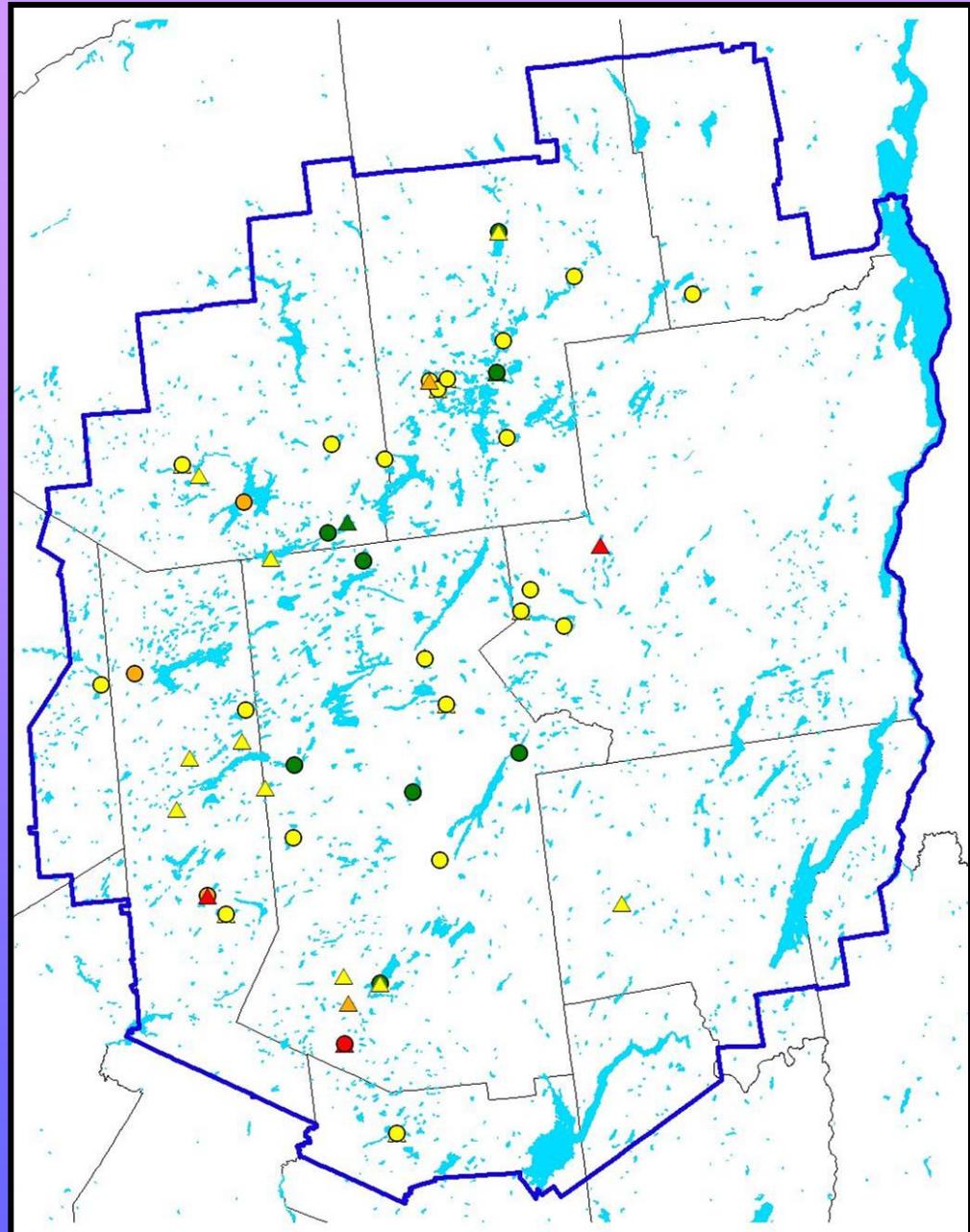
Loon Blood Hg Risk Category	% Females	% Males	% Juveniles	% Total Loons
XHigh	4%	0%	14%	7%
High	4%	21%	9%	11%
Moderate	50%	63%	66%	60%
Low	42%	17%	11%	22%

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# *Loon Blood Mercury Risk Categories*

Loon Blood Hg Risk Category	Number of Lakes		
	Adult Risk Category	Juvenile Risk Category	Total Loon Risk Category
X-High	1	3	4
High	3	2	5
Moderate	21	17	38
Low	8	2	10

Risk Category	Blood-Adult	Blood-Juv
X High	>4.0	>0.4
High	3.0-4.0	0.3-0.4
Moderate	1.0-3.0	0.1-0.3
Low	0-1.0	0-0.1



# *Mercury Exposure Profile*

## Water mercury



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# Sediment mercury



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# Zooplankton mercury



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# Crayfish mercury



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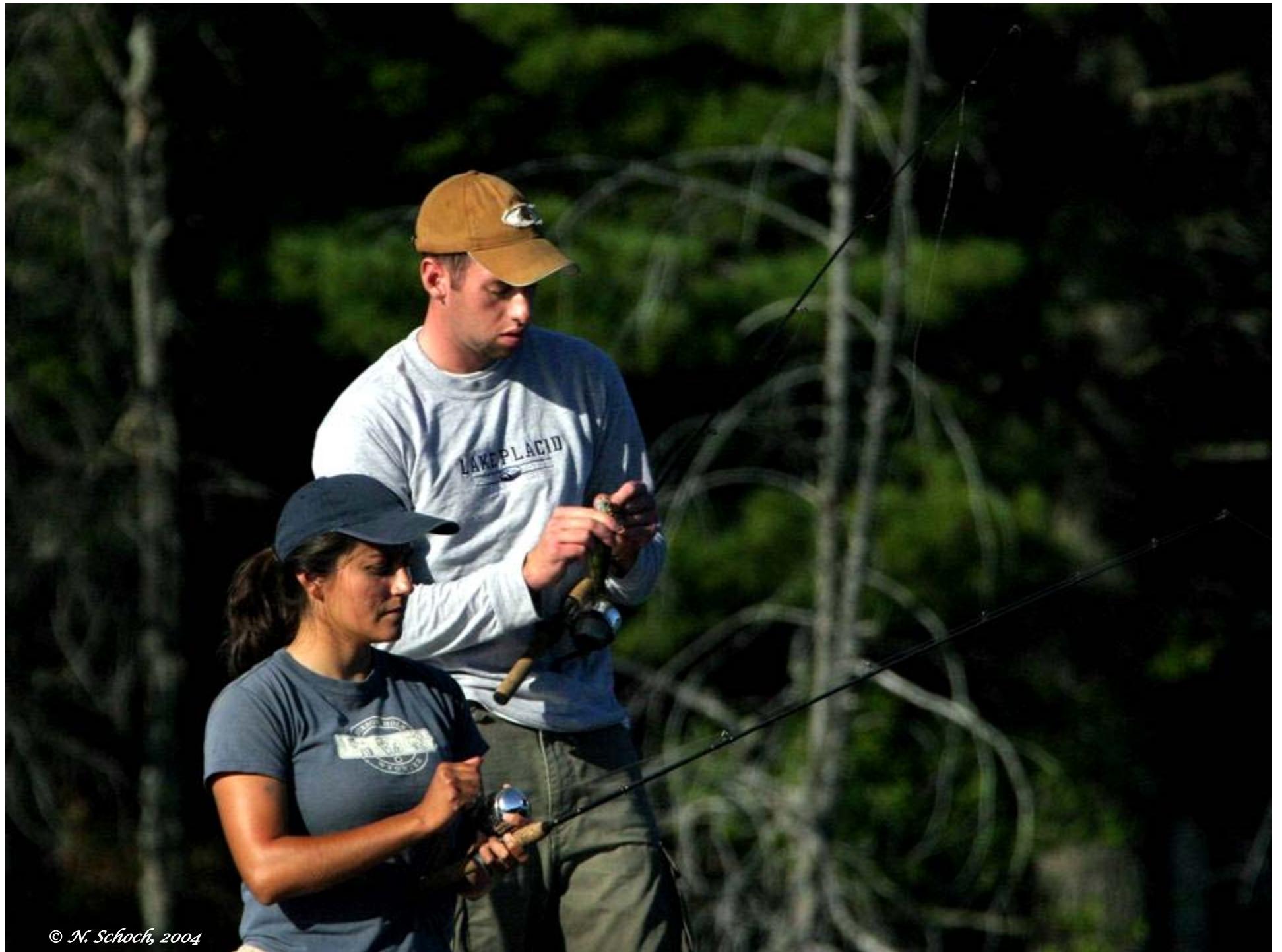


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# Prey fish mercury



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# *Preliminary Results*

## *Summary Statistics*

	THg (avg) (min - max)	MeHg (avg) (min - max)	%MeHg (avg) (min - max)
<b>Water (ng/L)</b>	<b>1.73</b> <b>(0.096 - 4.95)</b>	<b>0.15</b> <b>(0 - 3.10)</b>	<b>5.3</b> <b>(0-19)</b>
<b>Sediment (ng/g)</b>	<b>29.4</b> <b>(1.69 - 200)</b>	<b>2.2</b> <b>(0.002-27)</b>	<b>4.01</b> <b>(0.01 - 28)</b>
<b>Zooplankton (ug/g)</b>	<b>0.41</b> <b>(0.007 - 3.03)</b>	<b>0.12</b> <b>(0.004 - 1.29)</b>	<b>29.6</b> <b>(1.5 - 74)</b>

*N.Schoch, 2002*



- Assessment of Ecological Risk
  - Wildlife Criterion Value
- Loon Population Model



# *Public Outreach*

- Public presentations
- Newsletter – *The Adirondack Tremolo*

- Mountain Lake PBS:

*“The Call of the Loon: The Mercury Menace”*

- Lay reports

# MERCURY CONNECTIONS

*The extent and effects of  
mercury pollution in  
northeastern North America*



- Student curricula



N. Schoch, 2002



*Websites*

**[www.adkscience.org/loons](http://www.adkscience.org/loons)**

**[www.briloon.org](http://www.briloon.org)**

**[www.wcs.org/adirondacks](http://www.wcs.org/adirondacks)**

# *ACLP's Mercury Research and Education Projects Supported Through Grants and Donations to WCS and NHMA*

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- The Dodge Foundation
- The Freed Foundation
- Connie and Craig Weatherup



- New York State Energy Research and Development Authority
- Elk Lake Lodge and Margot Ernst
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*Gregory M. Nelson*  
[www.gmphotography.com](http://www.gmphotography.com)

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