

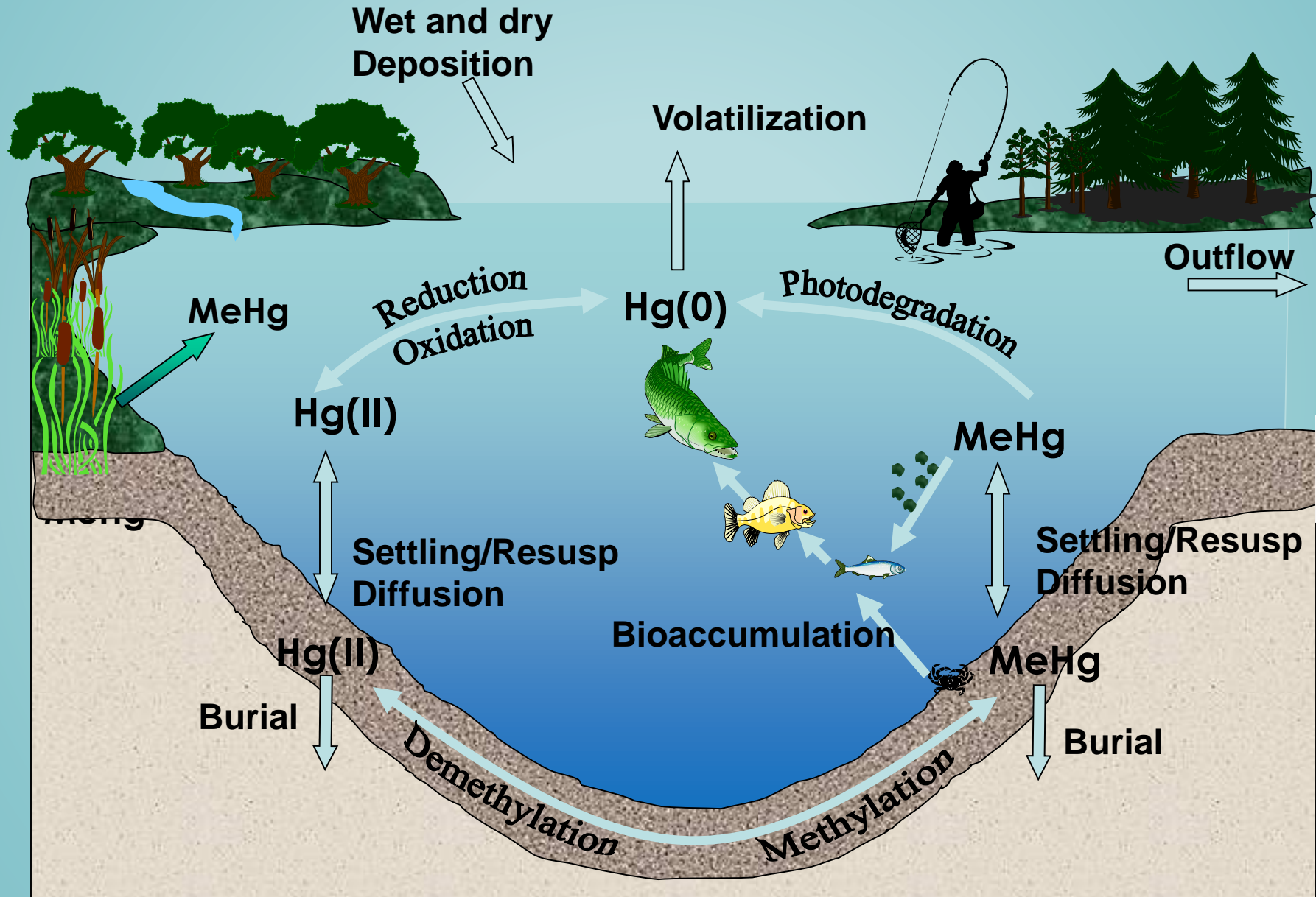
During the past 50 years, ELA
has done 3 things very well

1. Whole ecosystem manipulation experiments
2. Long term monitoring (Climate Change)
3. Education of the next generation of aquatic scientists.

1. Students flesh-out whole-ecosystem research at the ELA

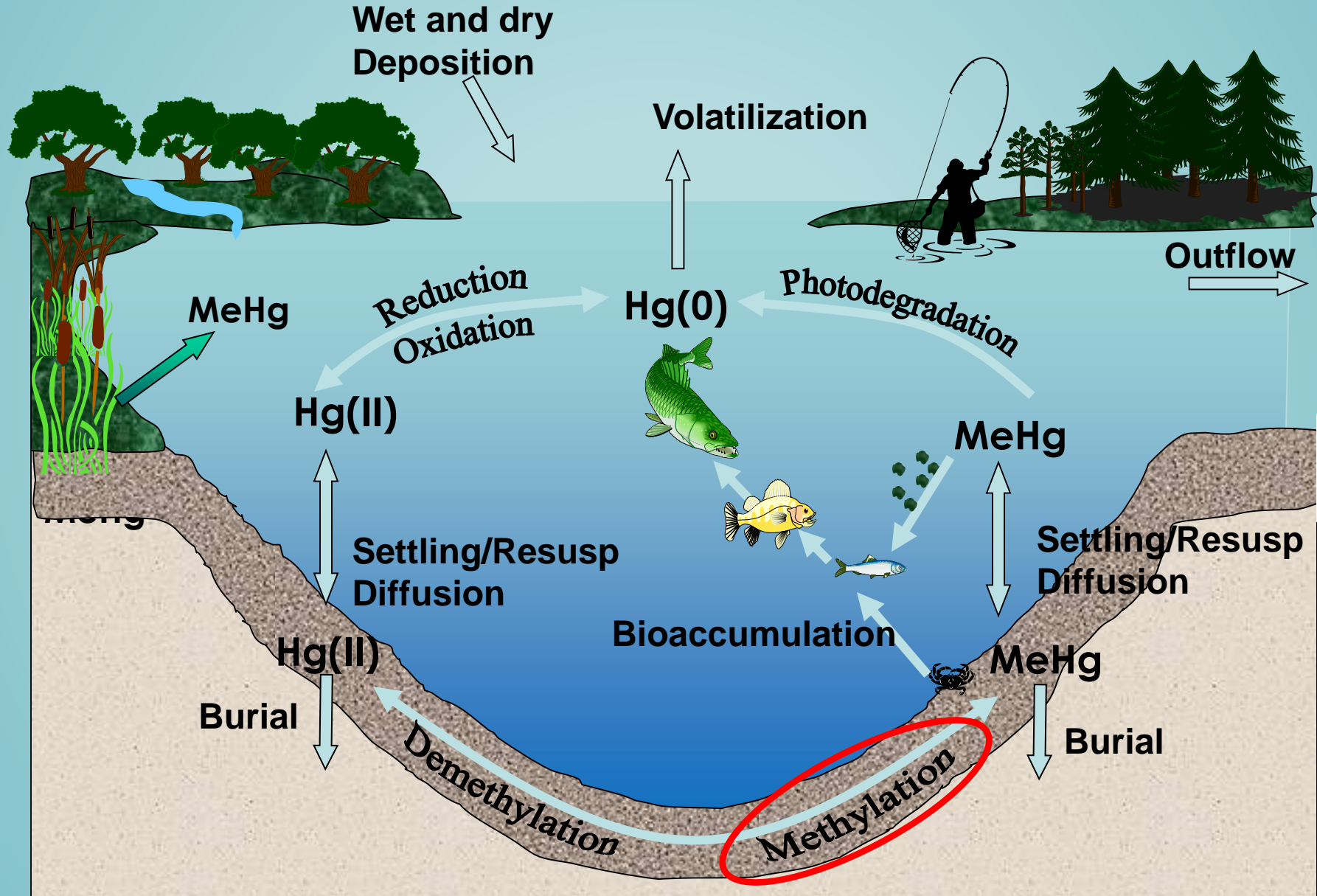


Mercury Cycling in Aquatic Systems



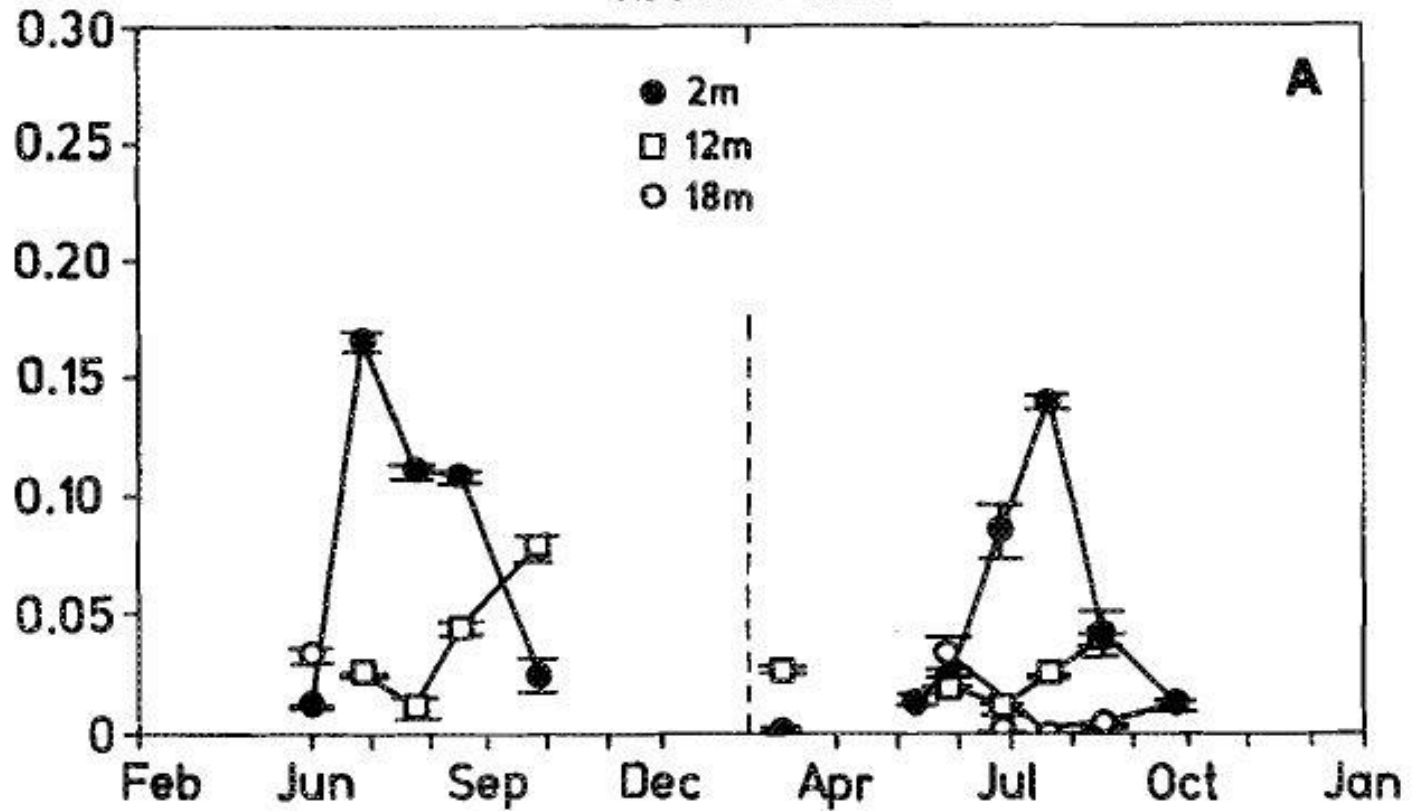


Mercury Cycling in Aquatic Systems



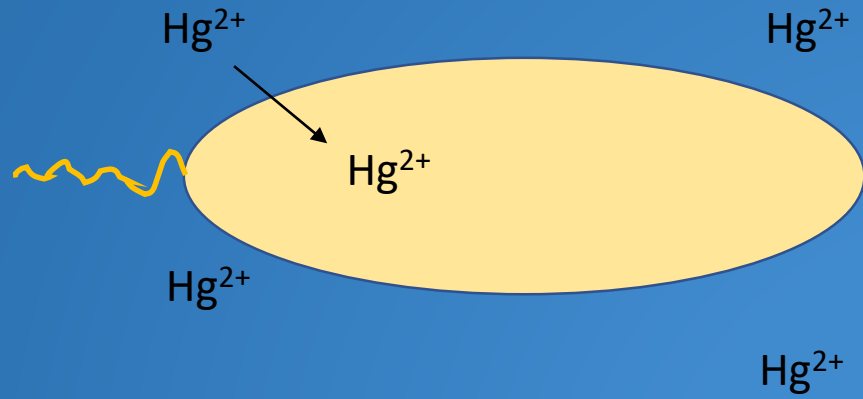
Sediment Methylation

Green Lake



Ramlal et al. 1993

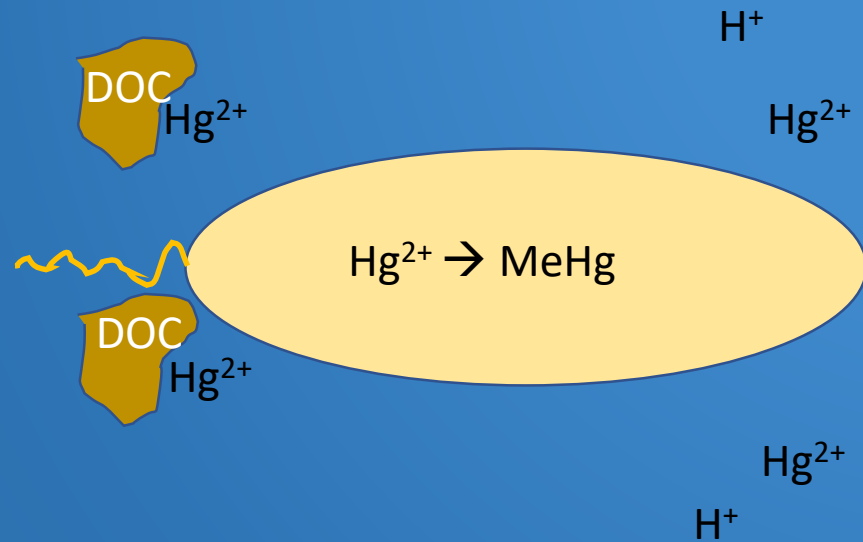




1999



George Golding

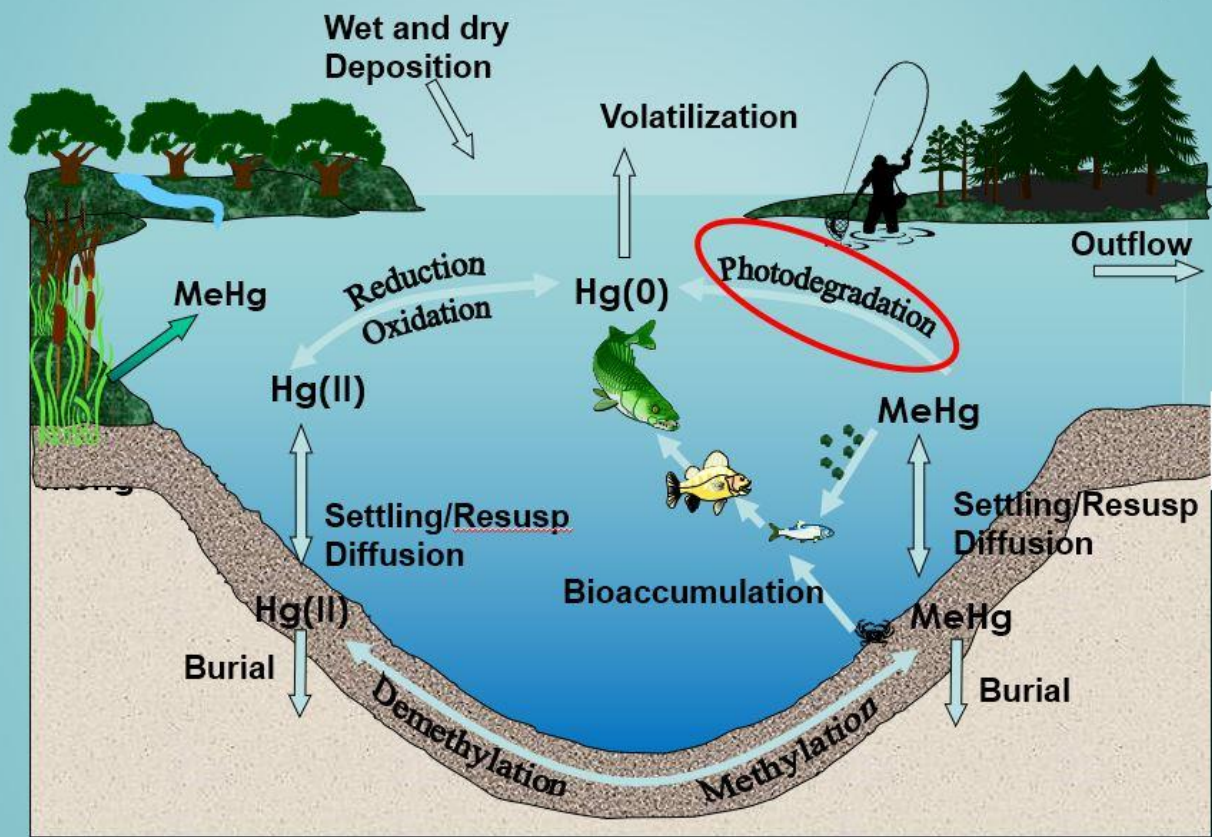


1992



Brenda Miskimmin

Mercury Cycling in Aquatic Systems



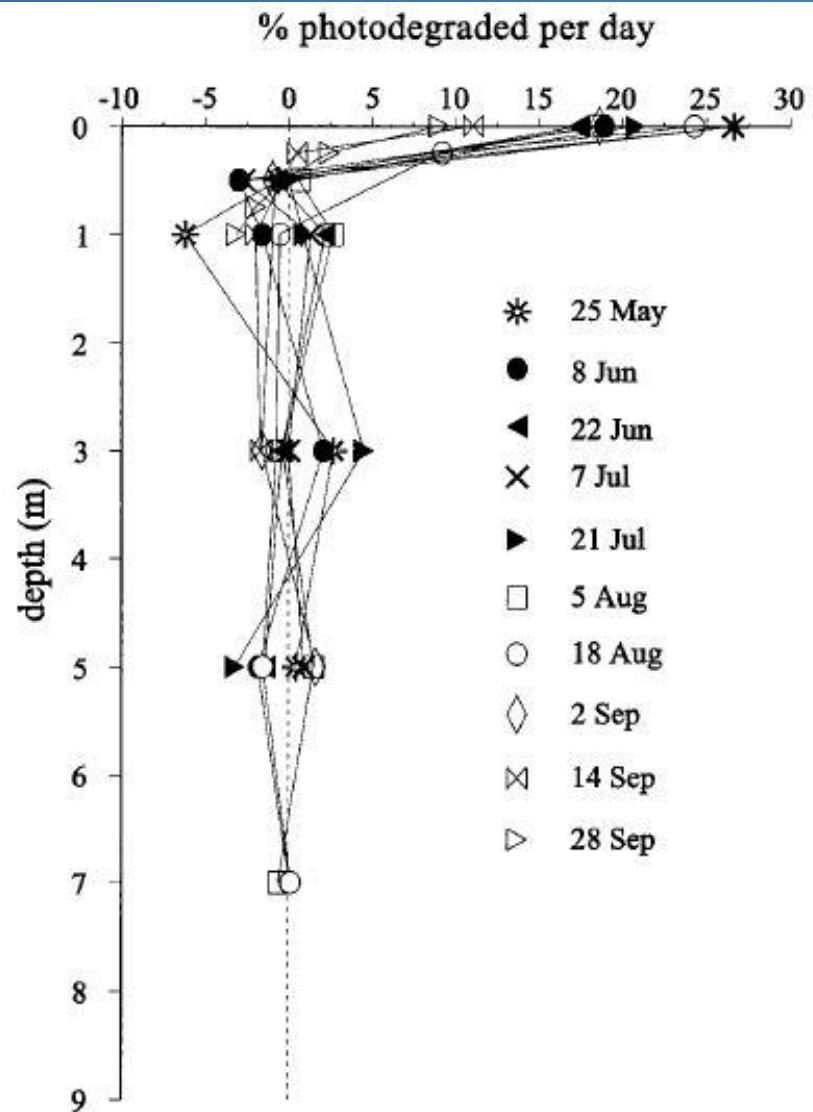
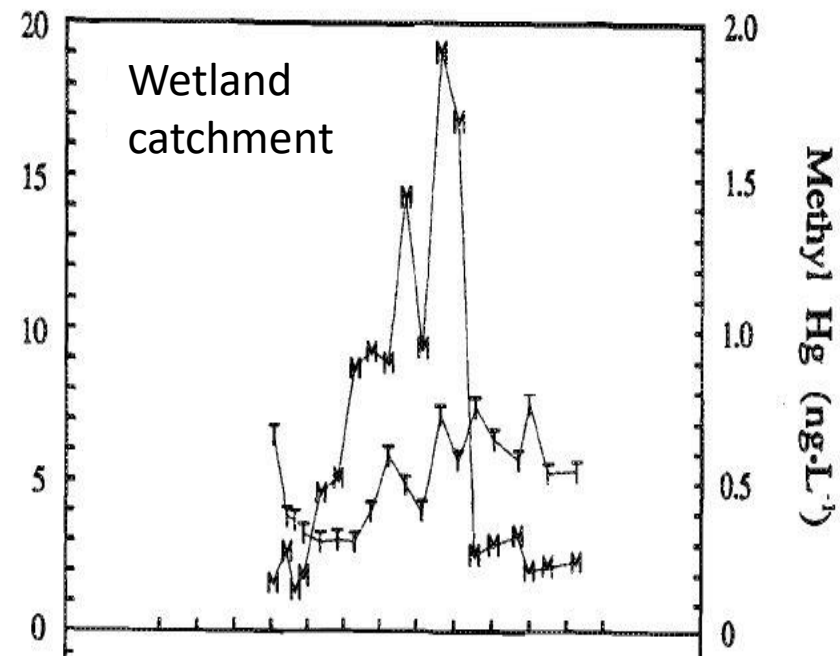
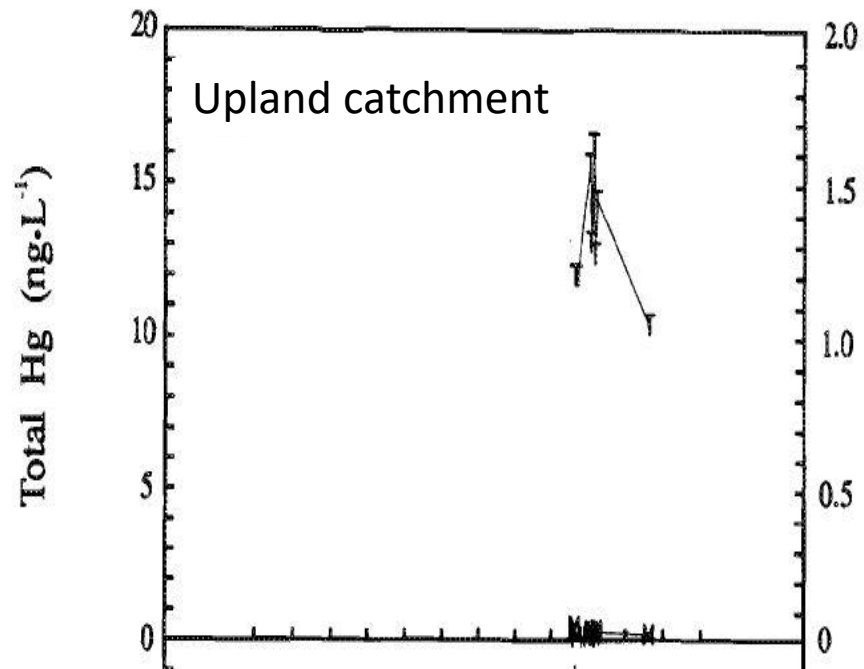


Fig. 5. Depth profiles of MeHg PRs in bottles incubated in Lake 240, 1995.

Photodegradation of methyl mercury in surface water of lakes.



Wetlands important sources of MeHg to downstream lakes
1990



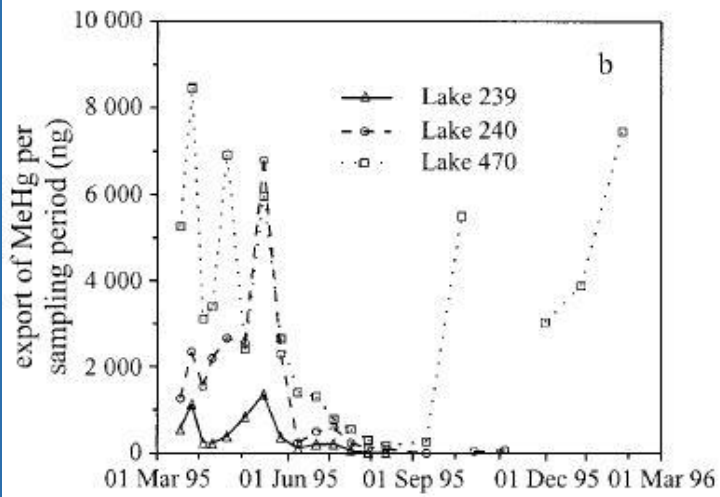
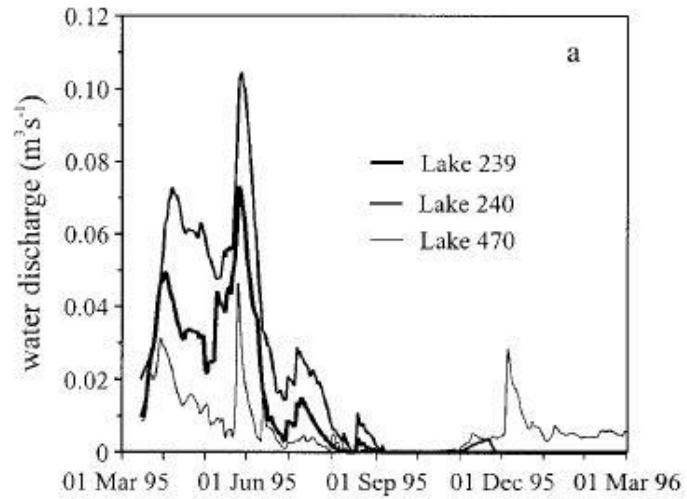
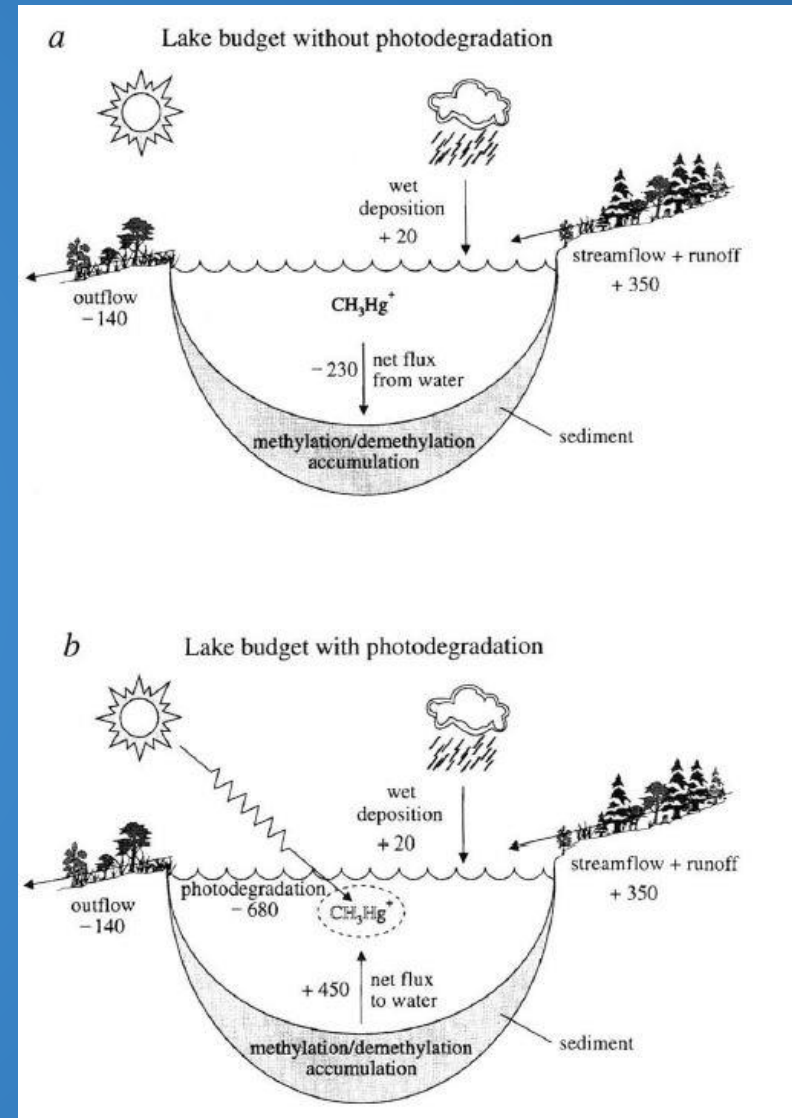


Fig. 1. (a) Water discharge, and (b) MeHg export from the study lakes, 1995–1996.

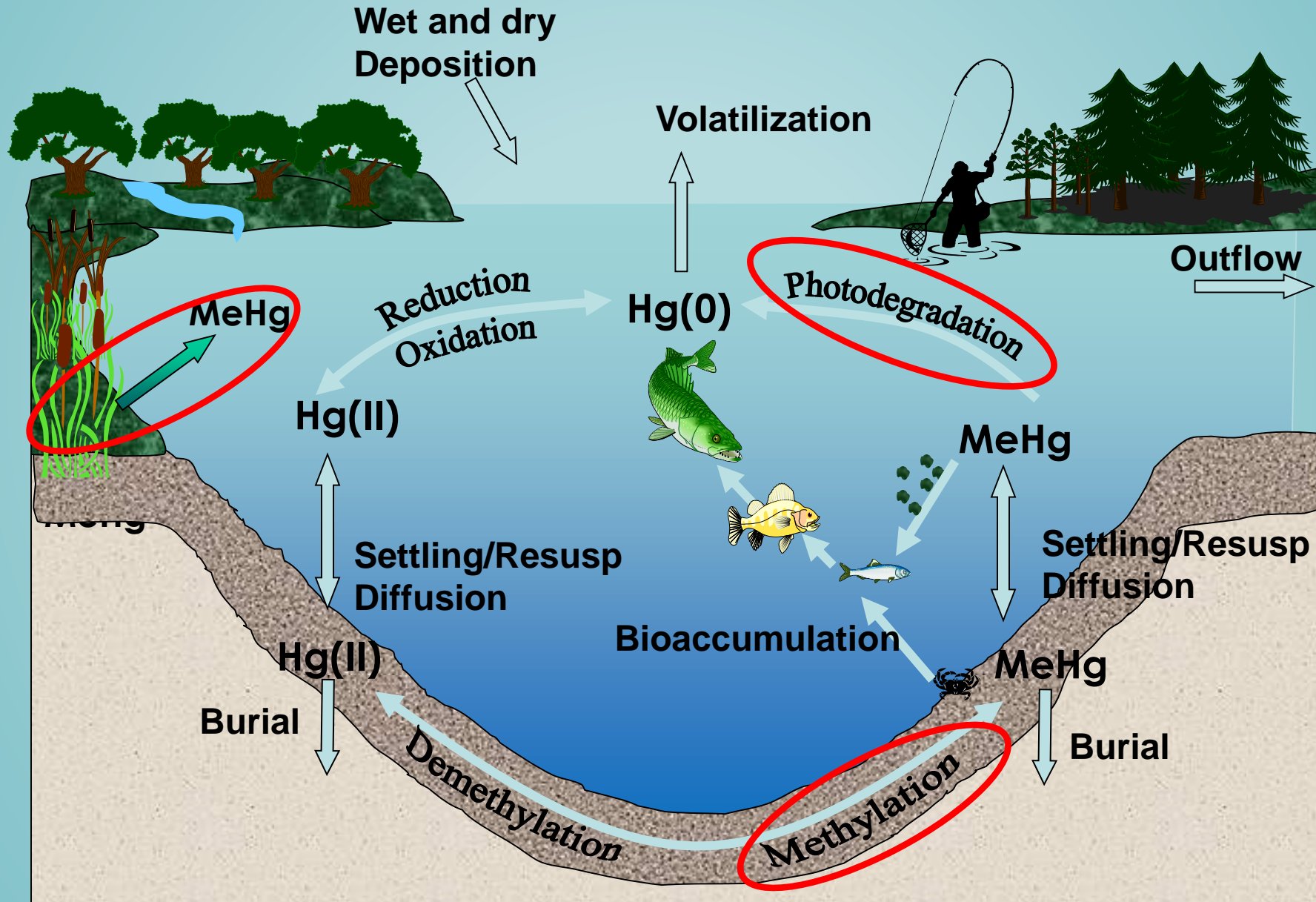


Alt Text: A person standing next to a tree





Mercury Cycling in Aquatic Systems



Experimental Lakes Area Theses						
	Thesis Type	Author Surname	Author First Name(s)	Thesis Title	Year	University
1	MSc	Hamid	A. A. A.	Measurement of nitrogen fixation ratio by acetylene reduction and estimation of seasonal inputs of biologically fixed nitrogen to several artificially fertilized lakes in the experimental lakes area of northwestern Ontario.	1972	University of Manitoba
2	MSc	Thompson	Barbara M.	Heterotrophic utilization of sucrose in an artificially enriched lake.	1972	University of Manitoba
3	MSc	Wiens	A. P.	Bionomics of the pitcher plant midge <i>Metriocnemus knabi</i> (Coquillett)(Diptera: Chironomidae).	1972	University of Manitoba
4	MSc	Flett	Robert John	Measurement of nitrogen fixation rates by acetylene reduction and estimation of seasonal inputs of biologically fixed nitrogen to several artificially fertilized lakes in the Experimental Lakes Area of northwestern Ontario.	1973	University of Manitoba
5	MSc	Kennedy	Keith G.	The hydrology and hydrochemistry of a small Precambrian Shield watershed.	1974	University of Waterloo
6	PhD	Emerson	S.	Radium-226 and radon-222 as limnologic tracers: The carbon dioxide gas exchange rate.	1974	Columbia University - Lamont Doherty Geological Observatory
1	Hons	Morrison	Gary J.	Microenvironmental variation and tree growth as a function of macroclimate in the Experimental Lakes Area, northwestern Ontario.	1975	Trent University
2	MSc	Levine	Suzanne N.	A preliminary investigation of orthophosphate concentration and the uptake of orthophosphate by seston in two Canadian Shield lakes.	1975	University of Manitoba
3	MSc	Allis	R. G.	Geothermal measurements in five small lakes of northwestern Ontario, Canada.	1975	University of Toronto
4	MSc	Bottomley	Dennis J.	Sources of streamflow and dissolved constituents in a small Precambrian Shield watershed.	1975	University of Waterloo
5	MSc	Campbell	Paul	Descriptive limnology of Lake 120, a meromictic lake on the Precambrian Shield in northwestern Ontario.	1976	University of Manitoba
6	PhD	Hesslein	Raymond H.	The fluxes of CH ₄ , total CO ₂ and NH ₃ -N from the sediments and their consequent distribution in small lakes.	1976	Columbia University - Lamont Doherty Geological Observatory
7	PhD	Rudd	John W. M.	Methane cycling in Lake 227 and its effects on whole lake metabolism.	1976	University of Manitoba
8	PhD	Vascotto	Gian L.	Zoobenthic assemblages of four central Canadian lakes and their potential use as environmental indicators.	1976	University of Manitoba
9	MSc	Dwilow	Andrew G.	Uptake of ammonium and nitrate by phytoplankton in lakes of the Experimental Lakes Area, northwestern Ontario.	1977	University of Manitoba
10	PhD	Quay	Paul D.	An experimental study of turbulent diffusion in lakes.	1977	Columbia University - Lamont Doherty Geological Observatory
11	PhD	Torgersen	Thomas	Limnologic studies using the tritium-helium-3 tracer pair: A survey evaluation of the method.	1977	Columbia University - Lamont Doherty Geological Observatory
12	PhD	Chan	Yiu-Kwok	Denitrification and phytoplankton assimilation of nitrate in Lake 227 during summer stratification.	1977	University of Manitoba
13	PhD	Flett	Robert John	Nitrogen fixation in Canadian Precambrian Shield lakes.	1977	University of Manitoba
14	MSc	Eloranta	Robert D.	The effect of acidification upon the bacterial flora of experimental enclosures in a soft water lake.	1978	University of Manitoba

15	MSc	Graham	Barbara W.	Comparison of nitrogen fixation rate estimation by nitrogen 15 uptake and acetylene reduction methods in freshwater blue-green algae.	1978	University of Manitoba
16	PhD	Kipphut	George W.	An investigation of sedimentary processes on lakes.	1978	Columbia University - Lamont Doherty Geological Observatory
17	PhD	Reinke	D. C.	The effects of cadmium on freshwater phytoplankton communities: a comparative algal assay study.	1980	University of Kansas
18	MSc	Nero	Redwood W.	The decline of <i>Mysis relicta</i> in response to experimental acidification of a whole lake	1981	University of Manitoba
19	MSc	Turner	Michael A.	Haptobenthic photosynthesis.	1981	University of Manitoba
20	PhD	Bower	Peter M.	Addition of radiocarbon to the mixed layers of two small lakes: primary production, gas exchange, sedimentation and carbon budget.	1981	Columbia University - Lamont Doherty Geological Observatory
21	PhD	Cook	Robert B.	The biogeochemistry of sulfur in two small lakes.	1981	Columbia University - Lamont Doherty Geological Observatory
22	PhD	Mills	Kenneth H.	The responses of a lake whitefish (<i>Coregonus clupeaformis</i>) to a whole lake fertilization.	1981	University of Manitoba
23	Hons	Solinske	Alan	Analysis and prediction of overwater windspeed on three small lakes in the Precambrian Shield.	1982	University of Winnipeg
24	MSc	Duncan	David A.	Development of acclimation-induced tolerance and resistance to acute cadmium toxicity in white sucker (<i>Catostomus commersoni</i>).	1982	University of Manitoba
25	MSc	Walichnowski	A. Z.	Studies into the effects of cadmium and low pH upon methane production.	1982	University of Manitoba
26	MSc	France	Robert L.	Life history response of the crayfish <i>Orconectes virilis</i> (Hagen) to acidification in the Experimental Lakes Area, northwestern Ontario: a laboratory and field study.	1983	University of Manitoba
27	MSc	Ramlal	Patricia S.	Measurement of biological mercury methylation in the littoral sediments of an acidified and unacidified lake.	1983	University of Manitoba
28	PhD	Levine	Suzanne N.	Natural mechanisms that ameliorate nitrogen shortages in lakes.	1983	University of Manitoba
29	MSc	Awang	G. M.	Studies into the effects of low pH on the methanogenic fermentation in anaerobic freshwater sediments.	1984	University of Manitoba
30	MSc	Davidson	Geoffrey A.	Paleolimnological reconstruction of the acidification history of Lake 223 (ELA).	1984	University of Manitoba
31	MSc	Loewen	Nancy R.	Evaluation of the acetylene inhibition technique for estimating denitrification in freshwater epilimnetic sediments using nitrogen-15.	1984	University of Manitoba
32	MSc	Xun	Luying	The effect of acid stress on methylation and demethylation of mercury in the whole-lake ecosystem.	1984	University of Manitoba
33	PhD	Musgrave	David L.	Penetrative convection in sediments.	1984	University of Alaska
34	MSc	Playle	Richard C	The effects of aluminum on aquatic organisms: 1) alum additions to a small lake, and 2) aluminum-26 tracer experiments with minnows.	1985	University of Manitoba
35	MSc	Ramsey	Douglas J.	The responses of planktonic crustacean communities in large enclosures to experimental acidification.	1985	University of Manitoba
36	PhD	Herczeg	Andrew L.	Carbon dioxide equilibria and d13C studies in some softwater lakes.	1985	Columbia University - Lamont Doherty Geological Observatory
37	PhD	Tam	Tat-Yee	Effect of acid precipitation on heterotrophic nitrification in Canadian Precambrian Shield lakes.	1985	University of Manitoba

38	MSc	Behr	Richard S.	Sulfur dynamics in an acidified mire in northwestern Ontario.	1986	University of Manitoba
39	PhD	Schiff	Sherry L.	Acid neutralization in sediments of freshwater lakes.	1986	Columbia University - Lamont Doherty Geological Observatory
40	MSc	Groulx	Gilles R.	Factors influencing the amount of cadmium in the phantom midge fly larva, <i>Chaoborus</i> spp.	1987	Trent University
41	MSc	Grapentine	Lee C.	Consequences of environmental acidification to the freshwater amphipod <i>Hyaella azteca</i> .	1987	University of Manitoba
42	PhD	Urban	Noel R.	The nature and origins of acidity in bogs.	1987	University of Minnesota
43	PhD	Servos	Mark R.	Fate and bioavailability of polychlorinated dibenzo-p-dioxins in aquatic environments.	1988	University of Manitoba
44	PhD	Howell	E. Todd	Ecology of periphyton associations with isoetid plants in low alkalinity lakes.	1988	University of Toronto
45	MSc	Miskimmon	Brenda M.	The influence of dissolved organic carbon on methyl mercury production and sediment-water partitioning in Precambrian Shield lakes.	1989	University of Manitoba
46	PhD	Sweerts	Jean-Pierre R. A.	Oxygen consumption, mineralization and nitrogen cycling at the sediment-water interface of north-temperate lakes.	1990	Rijksuniversiteit Groningen
47	PhD	Moffett	Mary F.	Responses of subepilimnetic primary producers to experimental lake acidification.	1991	University of Kansas
48	PhD	Amaral	John A.	Sulfate reduction and organic sulfur formation in lake sediments.	1991	University of Manitoba
49	PhD	Curtis	P. Jefferson	Biogeochemistry of iron in small Precambrian Shield lakes at the Experimental Lakes Area, northwestern Ontario.	1991	University of Manitoba
50	MSc	Palace	Vincent P.	Superoxide dimutase, catalase and glutathione peroxidase antioxidant enzyme activities as indicators of lipid peroxidative stress in freshwater fish.	1992	University of Manitoba
51	MSc	Mageau	Michael T.	The effects of turbulence and carbon concentration on competition between <i>Microcystis aeruginosa</i> and <i>Scenedesmus bijugatus</i> .	1992	University of Minnesota - Duluth
52	PhD	Crusius	John	Evaluating the mobility of cesium-137, plutonium-239+240 and lead-210 from their distributions in laminated sediments.	1992	Columbia University - Lamont Doherty Geological Observatory
53	PhD	Richards	Shirley R.	Organic volatile sulfur compounds in inland aquatic systems.	1992	University of Manitoba
54	PhD	St. Louis	Vincent L.	The effects of experimental lake acidification on the reproductive success of tree swallows.	1992	University of Toronto
55	MSc	Segstro	Mark	The bioavailability of polychlorinated dibenzo-p-dioxins to mussels and crayfish in aquatic ecosystems.	1993	University of Manitoba
56	PhD	Turner	Michael A.	The ecological effects of experimental acidification upon littoral algal associations of lakes in the boreal forest.	1993	University of Manitoba
57	MSc	Matos	Laudalino	The dynamics and chemistry of dissolved organic carbon in upland and wetland catchments, Experimental Lakes Area, Ontario.	1994	McGill University
58	MSc	Headon	Christine M.	Assimilation and depuration of methylmercury by crayfish, <i>Orconectes virilis</i> .	1994	Trent University

59	MSc	Boychuk	R. J.+	Hepatic mixed-function oxidase enzymes in white suckers (<i>Catostomas commersoni</i>) over a seasonal cycle and following injection with PCB congener 77.	1994	University of Manitoba
60	MSc	Currie	Robert S.	Bioavailability of sediment-associated contaminants to aquatic invertebrates in littoral mesocosms.	1994	University of Manitoba
61	MSc	Kyle	Marcia	Stoichiometric ratios of carbon, nitrogen and phosphorus in <i>Pseudomonas fluorescens</i> .	1994	University of Texas - Arlington
62	MSc	George	Nicolas B.	Nutrient stoichiometry of piscivore-planktivore interactions in two whole-lake experiments.	1994	University of Texas - Arlington
63	MSc	Fowle	Brian A.	The hydrology of a Precambrian Shield peatland: Controls on methylmercury formation and the flux.	1994	York University
64	MSc	Sellers	Todd J.	The distribution of lake trout, <i>Salvelinus namaycush</i> , and opossum shrimp, <i>Mysis relicta</i> , in small Boreal lakes with respect to temperature, dissolved oxygen, and light.	1995	University of Alberta
65	MSc	Murphy	K.-A.	Microbial Ecology of a freshwater fish kill.	1995	University of Western Ontario
66	MSc	Rooney	Neil M.	Phytoplankton community change in an experimentally acidified lake.	1995	University of Western Ontario
67	PhD	Delorme	Peter D.	The effects of toxaphene, chlordane and 2,3,4,7,8-pentachlorodibenzofuran on lake trout and white sucker in an ecosystem and the distribution and effects of 2,3,4,7,8-pentachlorodibenzofuran on white suckers and broodstock rainbow trout in laboratory experiments.	1995	University of Manitoba
68	MSc	Hall	Britt D,	Bioaccumulation of methylmercury by aquatic insects and fish at the Experimental Lakes Area.	1996	University of Manitoba
69	MSc	Mewhinney	Eric J.	The importance of hydrology to carbon dynamics in a small boreal forest wetland.	1996	University of Waterloo
70	PhD	Mackay	Neil A.	Ecological stoichiometry of zooplankton-phytoplankton interactions.	1996	Arizona State University
71	PhD	Heyes	Andrew	Methylmercury in natural and disturbed wetland.	1996	McGill University
72	MA	Cooley	Paul M.	Mapping the nearshore substrates and hydrodynamics in lakes.	1997	University of Manitoba - Natural Resources Institute
73	MSc	Bhardwaj	Anuraag K.	Seasonal variability of net carbon dioxide exchange in a headwater bog, Kenora, Ontario.	1997	McGill University
74	MSc	Davies	John Mark	An investigation and evaluation of photosynthetic and respiratory measurements as determined from pCO ₂ changes of incubated culture and lake water samples.	1997	University of Manitoba
75	MSc	Kling	Hedwig J.	Ecology, ontogeny, and morphometry of the freshwater centric diatom species complex, <i>Cyclotella bodanica/radiosa</i> .	1997	University of Manitoba
76	MSc	Samek	Michaela	The community structure of heterotrophic and autotrophic bacteria and microflagellates in four lakes of the Precambrian Shield and the possible roles of bacteria in mercury dynamics in freshwater systems.	1997	University of Manitoba
77	MSc	Poschadel	Christine D.	Floating peat island formation at an experimentally flooded wetland: impacts on methane and carbon dioxide production and flux rates to the atmosphere.	1997	University of Waterloo
78	MSc	Ray	Michael A.	The role of bacteria in a freshwater fish kill of an experimentally acidified lake.	1997	University of Western Ontario

79	MSc	Sharma	Sangitta	Fluxes of dimethyl sulfide from lakes of the Canadian Boreal Shield.	1997	York University
80	PhD	High	Kim A.	Metal-specific high performance liquid chromatography detection approaches for the characterization of metallothionein-like proteins from freshwater mussels.	1997	McGill University
81	PhD	Sellers	Patricia	Sediment flux and photodegradation of methylmercury in two boreal drainage lakes.	1997	University of Manitoba
82	PhD	Jeremiason	J. D.	The effects of variable trophic conditions on air-water exchange, cycling, and burial of organic contaminants in lakes.	1997	University of Minnesota
83	MSc	Dyck	Barbara S.	The species composition, aboveground biomass and carbon content of vegetation in two basin bogs in the Experimental Lakes Area, north-western Ontario.	1998	University of Manitoba
84	PhD	Stewart	A. Robin	Effect of a metal mixture (Cu, Zn, Pb, and Ni) on the bioavailability and bioaccumulation of cadmium in natural systems.	1998	University of Manitoba
85	PhD	Lamontagne	Sebastien	Nitrogen cycling in the upland Boreal Shield forest: Response to an experimental addition of nitrate.	1998	University of Waterloo
86	PhD	Webster	Katherine E.	Responses of lakes to drought: Geomorphic and landscape controls.	1998	University of Wisconsin - Madison
87	MSc	Callcott	Daryl R.	Predicting late winter oxygen profiles in temperate lakes.	1999	Trent University
88	Hons	Weidman	R. Paul	Distribution of ultraviolet light effects on epilithon within the littoral zone of an oligotrophic boreal forest lake.	2000	University of Manitoba
89	MNRM	Eddy	J. B.	Estimation of the abundance, biomass, and growth of a northwestern Ontario population of finescale dace (<i>Phoxinus neogaeus</i>), with comments on the sustainability of local commercial baitfish harvests.	2000	University of Manitoba - Natural Resources Institute
90	MNRM	Rabasco	Robert M.	Trophic effects of macrophyte removal on fish populations in a boreal lake.	2000	University of Manitoba - Natural Resources Institute
91	MSc	Gerrard	Pauline M.	The effects of experimental reservoir creation on the bioaccumulation of methylmercury and reproductive success of tree swallows (<i>Tachycineta bicolor</i>).	2000	University of Alberta
92	MSc	Watkins	Elise M.	Effects of solar ultraviolet radiation on epilithic metabolism, pigment and community composition in a clear-water, boreal lake.	2000	University of Alberta
93	MSc	Boudreau	Natalie M.	Soil carbon, carbon dioxide and methane in three experimentally flooded upland boreal forest reservoirs: A $\delta^{13}\text{C}$ inventory of sources and processes.	2000	University of Waterloo
94	PhD	Donohue	William F.	The direct and indirect effects of solar ultraviolet radiation in boreal lakes of the Experimental Lakes Area, northwestern Ontario.	2000	University of Alberta
95	MSc	Joyce	Elizabeth M.	The impact of experimental reservoir creation on greenhouse gas fluxes from forested uplands.	2001	University of Alberta
96	MSc	Embury	John R.	Food web structure, mercury biomagnification and carbon pathways in an experimentally flooded wetland.	2001	University of Manitoba
97	MSc	Johnson	M. W.	Indicators (parasites and stable isotopes) of trophic status of yellow perch (<i>Perca flavescens</i> Mitchell) in nutrient poor Canadian Shield lakes.	2001	University of Manitoba
98	PhD	Frost	Paul C.	Ecological stoichiometry of trophic interactions in the benthos of boreal lakes.	2001	Arizona State University
99	MSc	Poulain	Alexandre J.	Réduction biologique et photochimique du mercure dans un lac du bouclier canadien.	2002	Université du Québec, INRS-ETE

100	MSc	Baulch	Helen M.	Effects of increased temperature on epilithon and the implications of climate change.	2002	University of Alberta
101	MSc	Matthews	Corey J. D.	Greenhouse gas production in experimental reservoirs flooding upland boreal forest.	2002	University of Alberta
102	MSc	Peech Cherewyk	Katherine A.	Methylmercury bioaccumulation in zooplankton: an assessment of exposure routes and accumulation in newly flooded reservoirs.	2002	University of Manitoba
103	MSc	Venkiteswaran	Jason J.	A process-based stable isotope approach to carbon cycling in recently flooded upland boreal forest reservoirs. Univ. Waterloo.	2002	University of Waterloo
104	PhD	Xenopoulos	M. A.	The effects of solar radiation and water column mixing on the phytoplankton of boreal lakes.	2002	University of Alberta
105	MSc	Graydon	Jennifer A.	Mechanisms of mercury deposition under boreal forest canopies: Contributions of new and recycled inputs.	2003	University of Alberta
106	MSc	Park	B. J.	Effects of the environmental estrogen 17 α -ethynylestradiol on early development of green frogs (<i>Rana clamitans</i>) and mink frogs (<i>R. septentrionalis</i>) at the Experimental Lakes Area (Ontario, Canada).	2003	University of Manitoba
107	MSc	Saquet	Michelle A. M.	Greenhouse gas flux and budget from an experimentally flooded wetland using stable isotopes and geochemistry.	2003	University of Waterloo
108	PhD	Lalonde	Jannick D.	Les réactions d'oxydoréduction du Hg dans l'eau de surface et la neige.	2003	Université du Québec, INRS-ETE
109	PhD	Hall	Britt D.	Impacts of reservoir creation on the biogeochemical cycling of methylmercury in boreal forest uplands.	2003	University of Alberta
110	PhD	Scott	Karen J.	Development and use of mer-lux bioreporter for the measurement and characterization of bioavailable Hg(II) in defined media and aquatic environmental samples.	2003	University of Manitoba
111	Hons	Aoki	Katie A. A.	The effects of 17 alpha-ethynylestradiol on <i>Daphnia</i> .	2004	University of Manitoba
112	MSc	Mailman	Mariah	Effects of burning before flooding on methyl mercury and greenhouse gas concentrations.	2004	University of Manitoba
113	MSc	Radomske	E. H.	Dependencies of food web and nutrient cycling dynamics on dissolved organic matter (DOM) and inorganic nutrient concentrations in lake enclosures.	2004	University of Northern British Columbia
114	PhD	Sarica	José	Les transferts du mercure bioaccumulé dans les carcasses de poisson vers les organismes aquatiques et vers les invertébrés terrestres nécrophages.	2004	Université du Québec, INRS-ETE
115	MNRM	Orihel	Diane M.	The effects of changes in atmospheric mercury deposition on the bioaccumulation of mercury by fish.	2005	University of Manitoba - Natural Resources Institute
116	MSc	Page	Bryan C.	A comparative study of mercury speciation and the vertical movement of newly added mercury across the mercury methylation layer in three contrasting wetlands.	2005	University of Manitoba
117	PhD	Golding	George	The effect of various physiological conditions on mercury(II) uptake in <i>Escherichia coli</i> and <i>Vibrio anguillarum</i> .	2005	University of Manitoba
118	MSc	Christiansen	Michael R.	Impacts of multiple anthropogenic stressors on boreal planktonic communities.	2006	University of Alberta
119	MSc	Phillips	Iain D.	The boys are back in town: <i>Orconectes virilis</i> re-introduction to Lake 3025.	2006	University of Alberta
120	MSc	Rooney	Rebecca R.	The influence of rainbow trout (<i>Oncorhynchus mykiss</i>) cage farm on the benthic environment and invertebrate fauna of Lake 375,	2006	University of Manitoba
121	MSc	VanWallegghem	Jillian L. A.	The elimination of mercury by fish in the wild.	2006	University of Manitoba
122	MSc	Kullman	Marilynn	Assimilation of freshwater salmonid aquaculture waste by native aquatic biota.	2006	University of New Brunswick

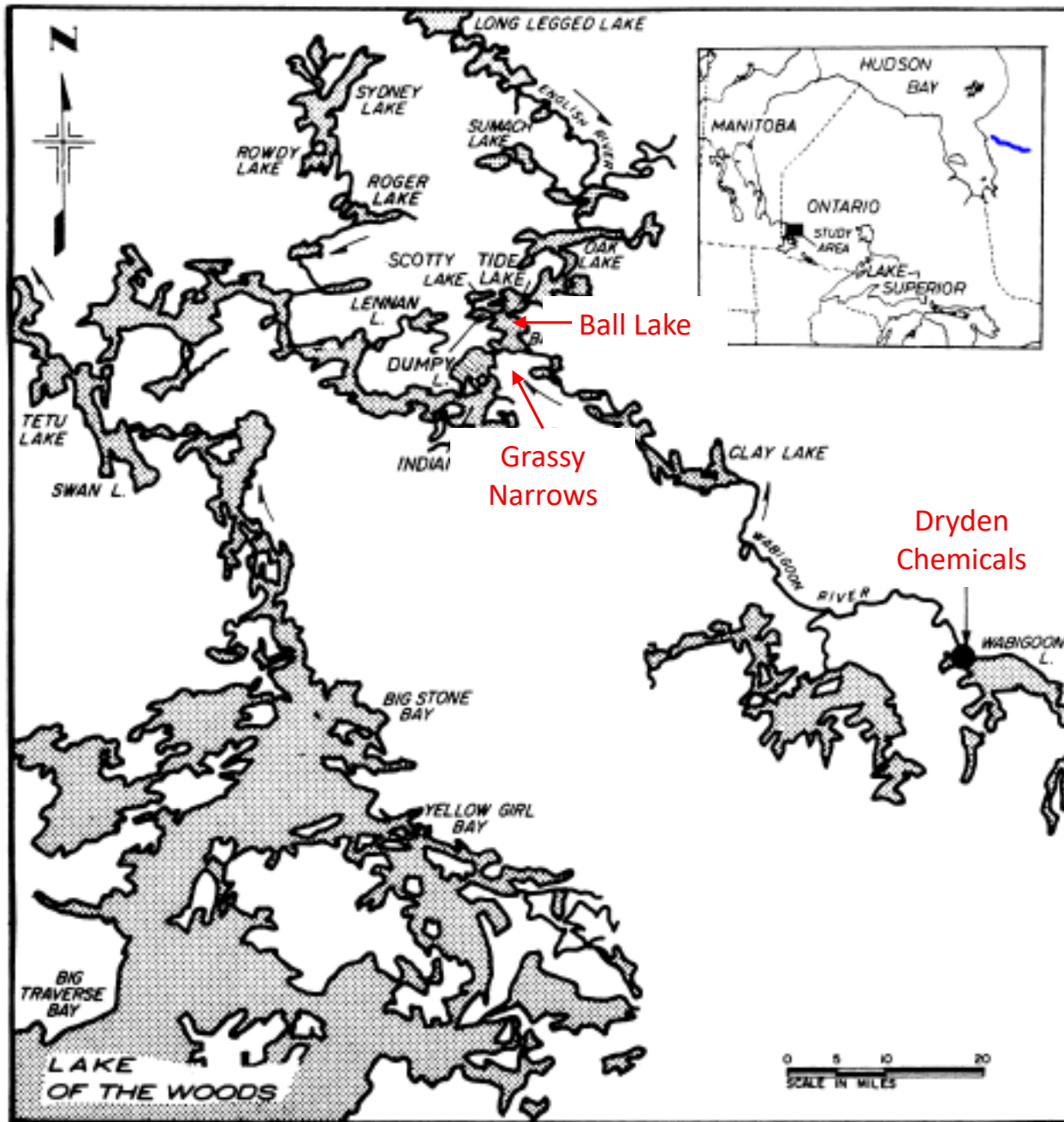
123	MSc	Bristow	Corbin E.	Experimental freshwater cage aquaculture : short term effects on carbon, nitrogen and phosphorus budgets and the metabolism of a boreal shield lake.	2006	University of Ottawa
124	PhD	Chadwick	Shawn P.	Fate and transport of ambient and amended mercury in a stratified temperate lake.	2006	University of Wisconsin - Madison
125	MA	Li	Guiyou	The role of iron in the control of noxious, bloom-forming Cyanobacteria in productive and unproductive waters.	2007	York University
126	MSc	Plumb	J. M.	Climate-mediated changes in habitat use by lake trout (<i>Salvelinus namaycush</i>).	2007	University of Manitoba
127	PhD	Werner	Julieta	Development of methods to assess metallothionein expression in lake trout (<i>Salvelinus namaycush</i>) during a reproductive cycle and the effects of cadmium and ethynylestradiol.	2007	University of Manitoba
128	PhD	Mitchell	Carl P. J.	Mercury methylation hot spots in peatlands.	2007	University of Toronto
129	MSc	Wellman	S. J.	2008. Nutrient flow in a freshwater food web during and after an experimental aquaculture operation.	2008	University of New Brunswick
130	MSc	Zhang	Jan	Long-term patterns of dissolved organic carbon in boreal lakes.	2008	University of Saskatchewan
131	PhD	Clasen	Jessica L.	Viral ecology of lakes: A descriptive and ecological study of viruses that infect phytoplankton.	2008	University of British Columbia
132	PhD	Mailman	Mariah	Assessment of mercury and selenium interactions in freshwater.	2008	University of Manitoba
133	PhD	Venkateswaran	Jason J.	Greenhouse gas cycling in experimental boreal reservoirs.	2008	University of Waterloo
134	Hons	Putt	A.	Changes in the depth distribution of lake trout (<i>Salvelinus namaycush</i>) and their prey <i>Mysis relicta</i> in response to freshwater aquaculture operations in the Experimental Lakes Research Area, Ontario.	2009	University of Manitoba
135	MSc	Frazer	Lynn. V.	Paleolimnological reconstruction of cladoceran community reassembly following experimental manipulation of two boreal shield lakes.	2009	University of Manitoba
136	MSc	Hille	Kelly A.	Does aquaculture impact benthic ecology? A study on the effects of an experimental cage aquaculture operation on epilithic biofilms.	2009	University of Manitoba
137	MSc	Seckar	Dalislá	Interactions between <i>Chaoborus</i> spp. and <i>Mysis relicta</i> and their impact on pelagic crustacean zooplankton in mesocosms at the Experimental Lakes Area.	2009	University of Manitoba
138	PhD	Graham	Mark D.	Primary producers and consumers in boreal lakes under a changing environment.	2009	University of Alberta
139	PhD	Graydon	Jennifer	Influence of terrestrial vegetation on mercury deposition to the boreal forest ecosystem.	2009	University of Alberta
140	MNRM	Duggirala	Bhanu	Analyzing sustainable energy opportunities for a small scale off-grid facility: a case study at Experimental Lakes Area (ELA), Ontario.	2010	University of Manitoba - Natural Resources Institute
141	MSc	Kingsbury	Melanie V.	Diatom assemblages in relation to water-depth gradients in eight boreal shield lakes from northwestern Ontario, Canada.	2010	Queens University
142	MSc	Mowat	Linnea D.	Influence of forest canopies on the deposition of methylmercury to boreal ecosystem watersheds.	2010	University of Alberta
143	MSc	Godard	Danielle R.	Pathological examination of fish exposed to explosive based instantaneous pressure change.	2010	University of Manitoba
144	MSc	Ghorpade	S. M.	Interactions between natural organic matter and mercury transport in a boreal watershed.	2010	University of Maryland
145	PhD	Moos	Melissa T.	Tracking long-term Holocene climate trends in Lake 239 (Experimental Lakes Area, NW Ontario) using diatoms, pollen, and charcoal.	2010	Queens University
146	MSc	Flear	Karlee	Changes in scaled-chrysophyte assemblages in response to recent climate change in northwestern Ontario.	2011	Queens University

Experimental Lakes Area Theses						
	Thesis Type	Author Surname	Author First Name(s)	Thesis Title	Year	University
147	MSc	Hrenchuk	Lee	Accumulation of dietary and waterborne mercury by fish - experimental and whole-ecosystem approaches using enriched stable isotopes.	2011	University of Manitoba
148	MSc	Patterson	Kristen	The fate of farmed rainbow trout (<i>Oncorhynchus mykiss</i>) released from commercial aquaculture operations in Lake Huron.	2011	University of Manitoba
149	PhD	Jeziorski	Adam	Crustacean zooplankton sedimentary assemblages and the calcium concentration of softwater Ontario lakes.	2011	Queens University
150	PhD	Lehnherr	Igor	Production and cycling of methylated mercury species in high Arctic freshwater and marine ecosystems.	2011	University of Alberta
151	PhD	Oswald	Claire J.	Hydrological, Biogeochemical and Landscape Controls on Mercury Distribution and Mobility in a Boreal Shield Soil Landscape.	2011	University of Toronto
152	PhD	Orihel	Diane M.	The role of iron in suppressing internal phosphorus loading and toxic cyanobacterial blooms in freshwater lakes	2013	University of Alberta

ELA education is unique & can be easily applied to other ecosystems

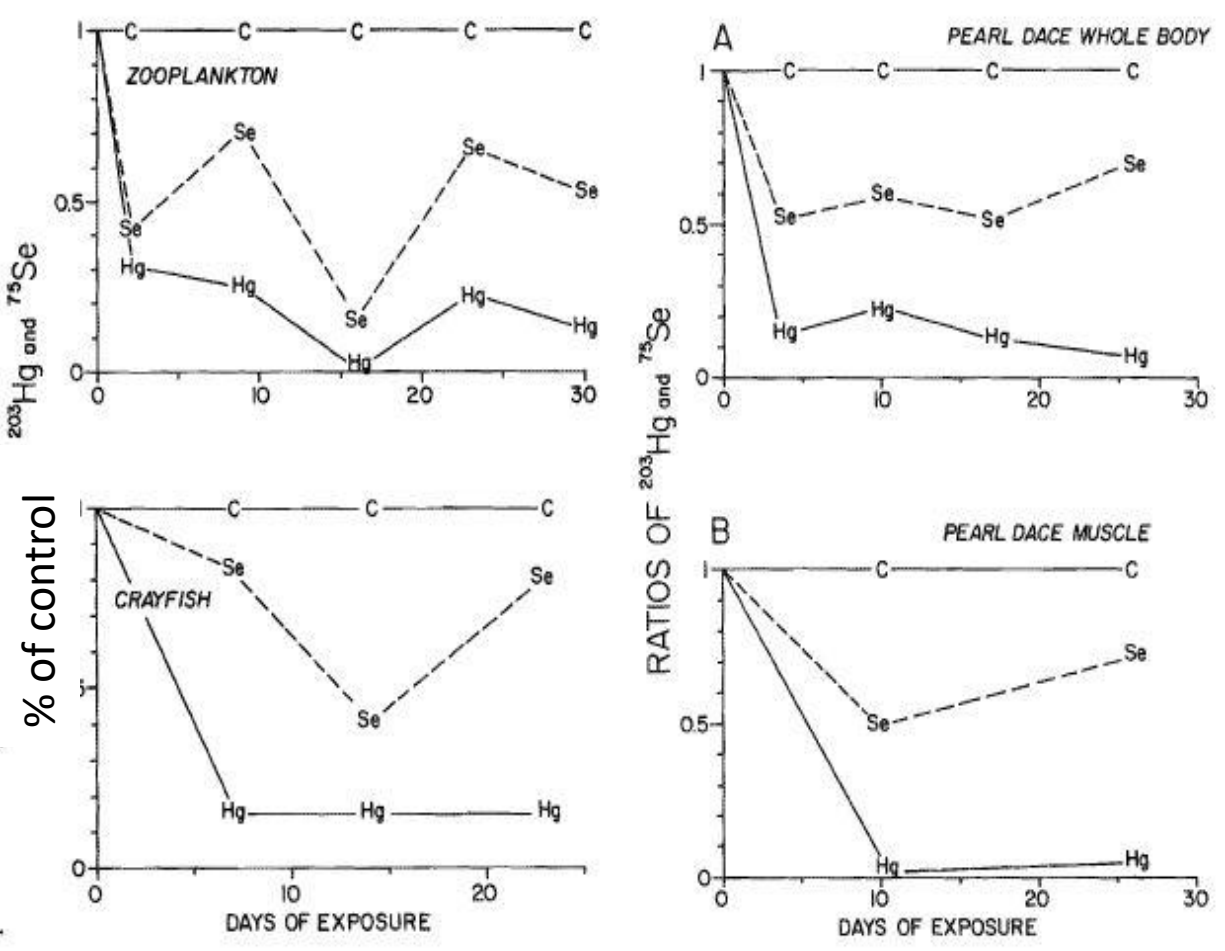
Two examples.....

- English-Wabigoon River System
- Penobscot Estuary



Mercury
contamination of the
English-Wabigoon
River System
110 km

Additions of clean clay reduces mercury uptake by 90%



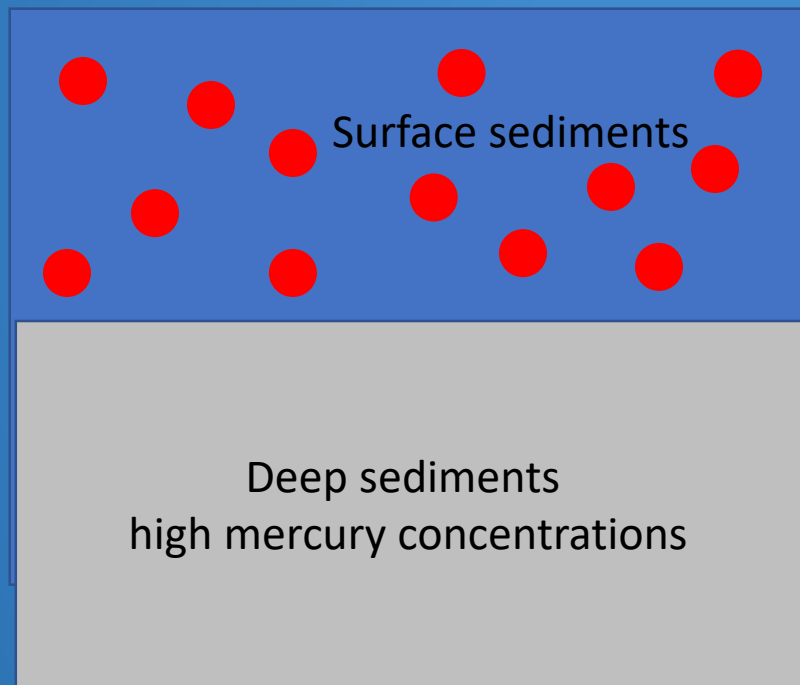
1983



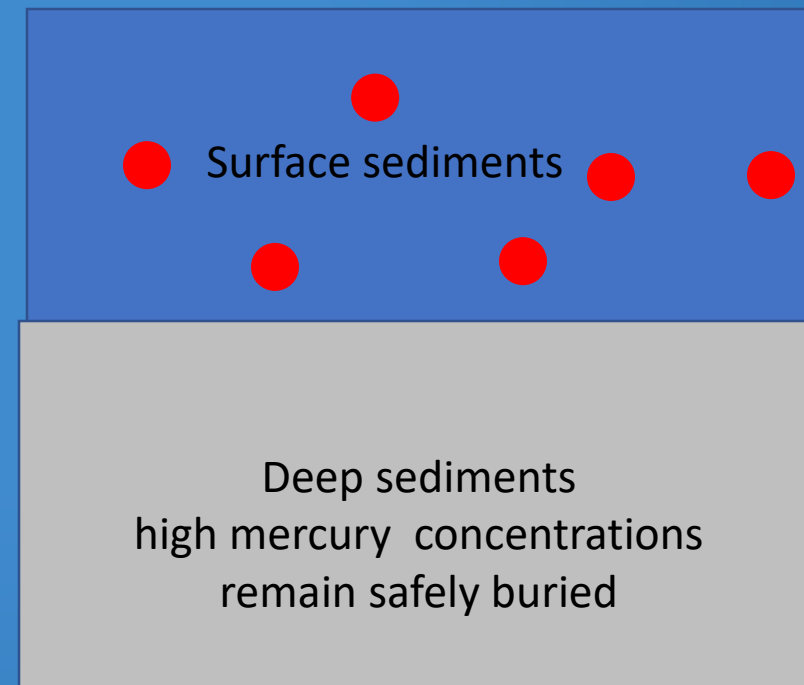
Remediation by addition of clean-clay which dilutes inorganic mercury in surface sediments where methylation occurs

1984

Before treatment



After treatment



● = mercury



Cabinet Submission

Revision of Submission dated

March 30, 1984

Ministry

ENVIRONMENT

Date

April 3/84

Page No.

4 of 12

RECOMMENDATIONS

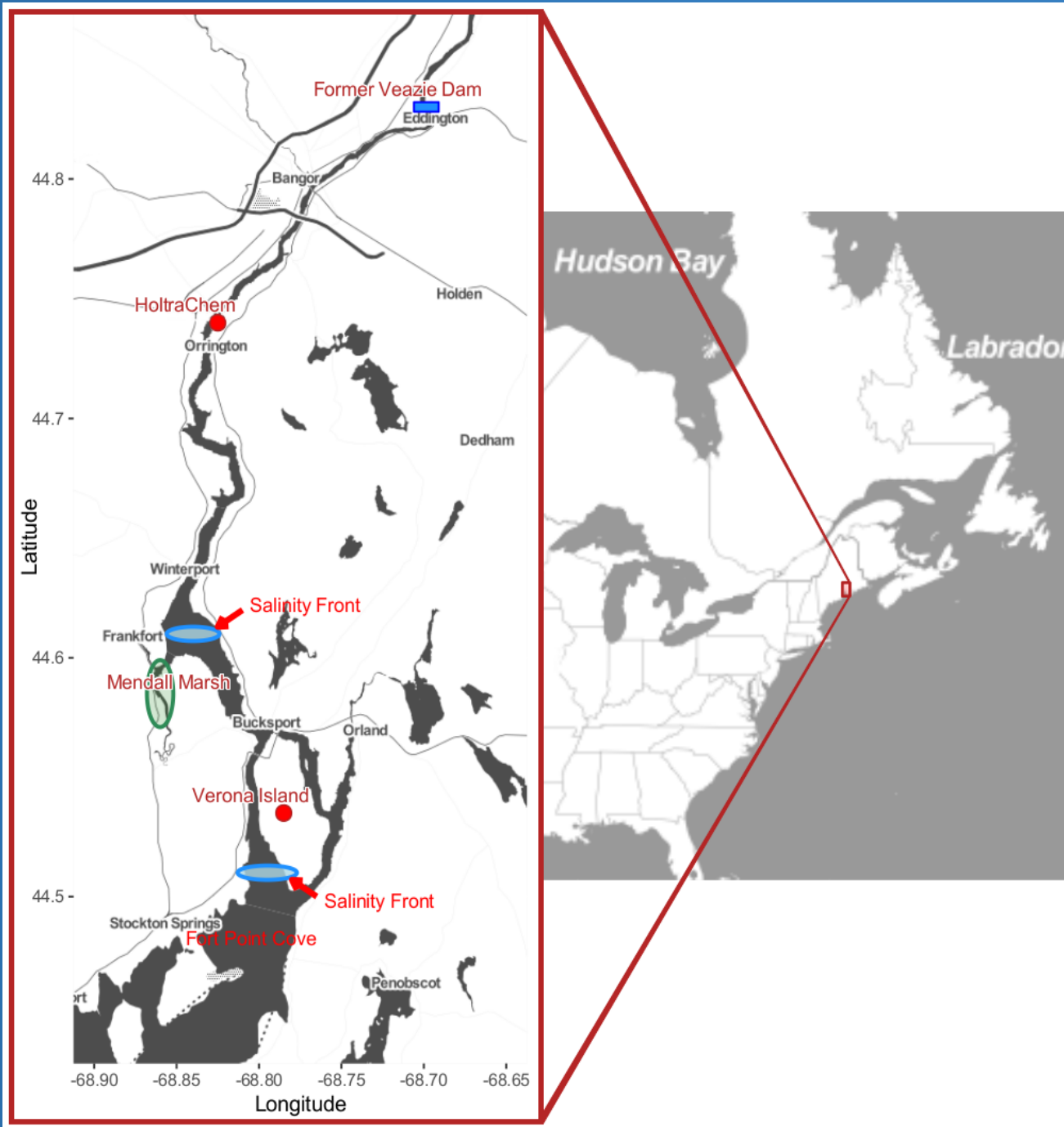
1. THAT THE STEERING COMMITTEE REPORT BE RELEASED IN A MANNER TO ALLOW THE INVOLVEMENT OF GROUPS AND INDIVIDUALS DIRECTLY CONCERNED WITH THE ISSUE OF MERCURY CONTAMINATION IN THE ENGLISH-WABIGOON SYSTEM.
2. **THAT CABINET ENDORSE THE RECOMMENDATIONS OF THE STEERING COMMITTEE RESPECTING ONGOING MONITORING AND INITIATION OF THE RESUSPENSION PROJECT FOR CLAY LAKE AS A REMEDIAL MEASURE TO DEAL WITH THE MERCURY POLLUTION;** AND THAT THE DREDGING OPTION REQUIRES FURTHER STUDY.
3. THAT THE MINISTRY OF THE ENVIRONMENT ACCEPT RESPONSIBILITY FOR COORDINATION OF A RESPONSE TO THE STEERING COMMITTEE'S RECOMMENDATIONS.

1984

Clean-Clay addition recommended to remediate the English-Wabigoon

2nd example

50 years of Mercury
contamination in the
Penobscot Estuary
45 km





Karen Kidd



Drew Bodaly

Penobscot Mercury Study



Rocky Geyer
WHOI



Peter Santschi



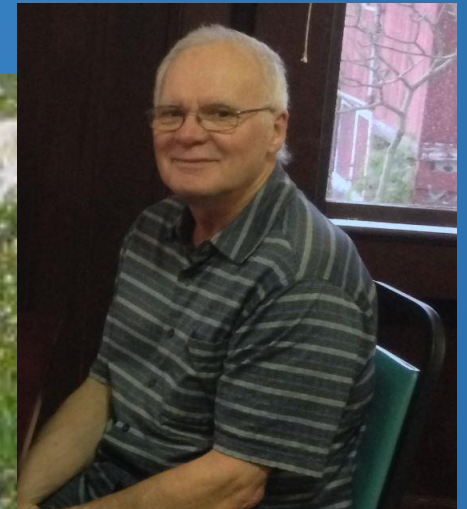
Bob Flett



Kevin Yeager
U. Kentucky



Carol Kelly



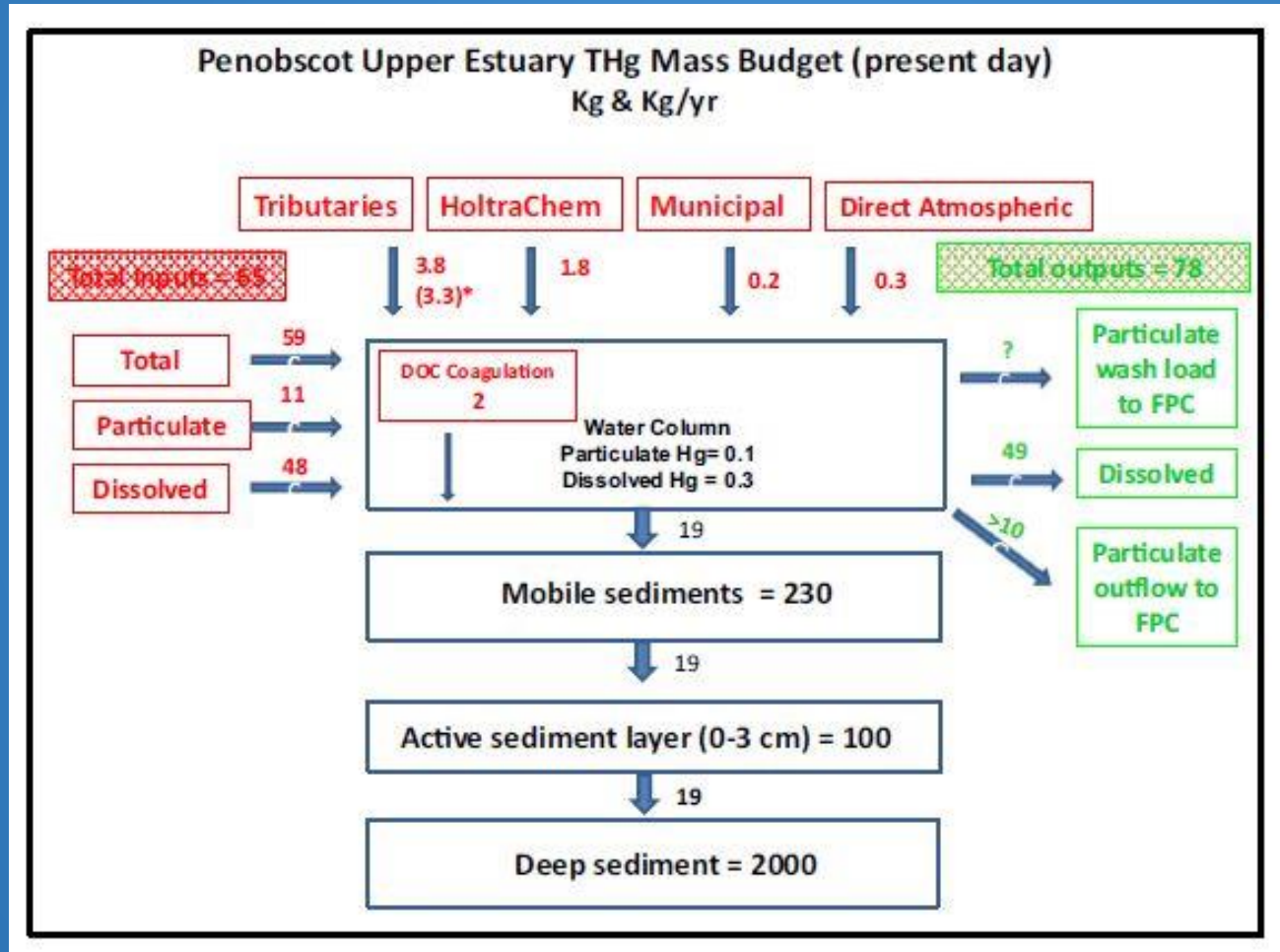
John Rudd



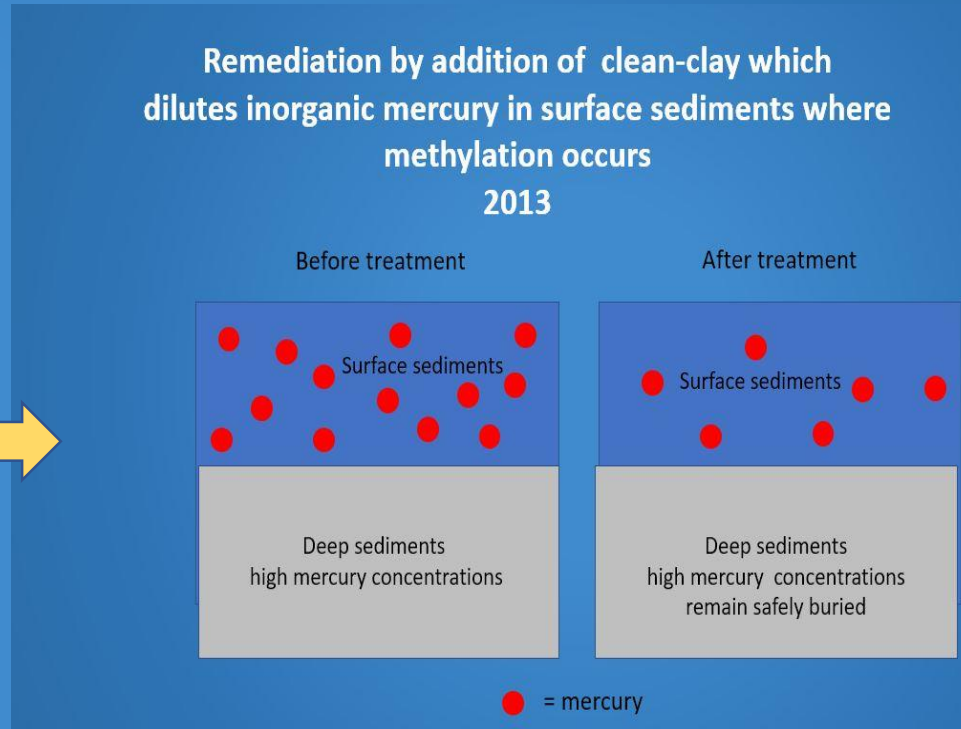
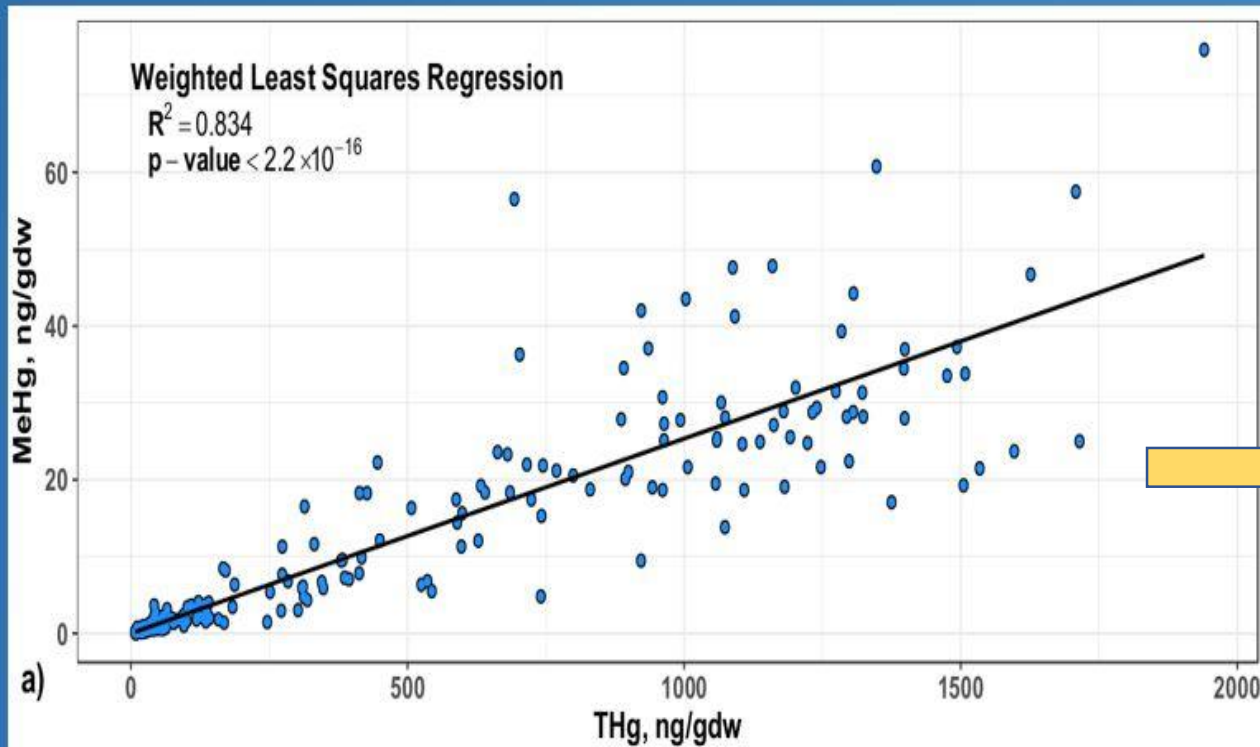
Geyer findings

1. Mercury particle bound
2. Mercury trapped upstream of salt-fronts

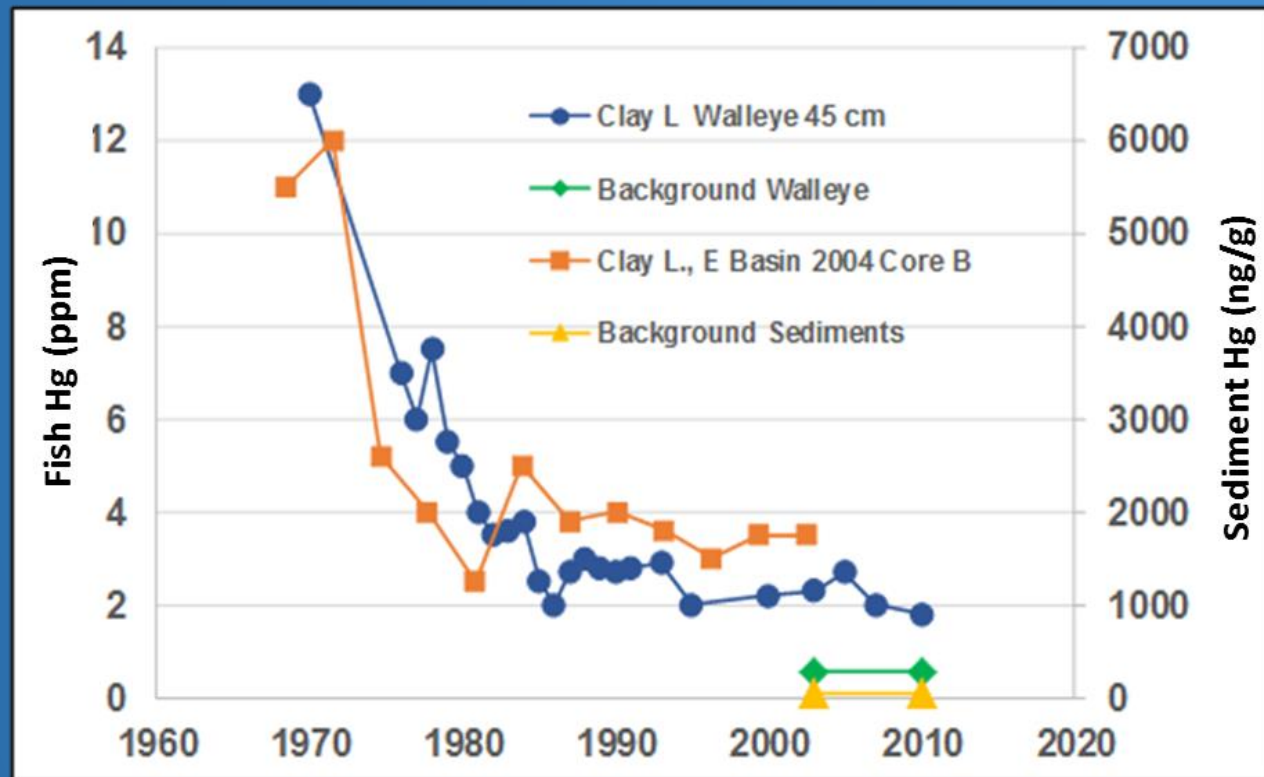
Mass balance constructed to make sure we were understanding the ecosystem.



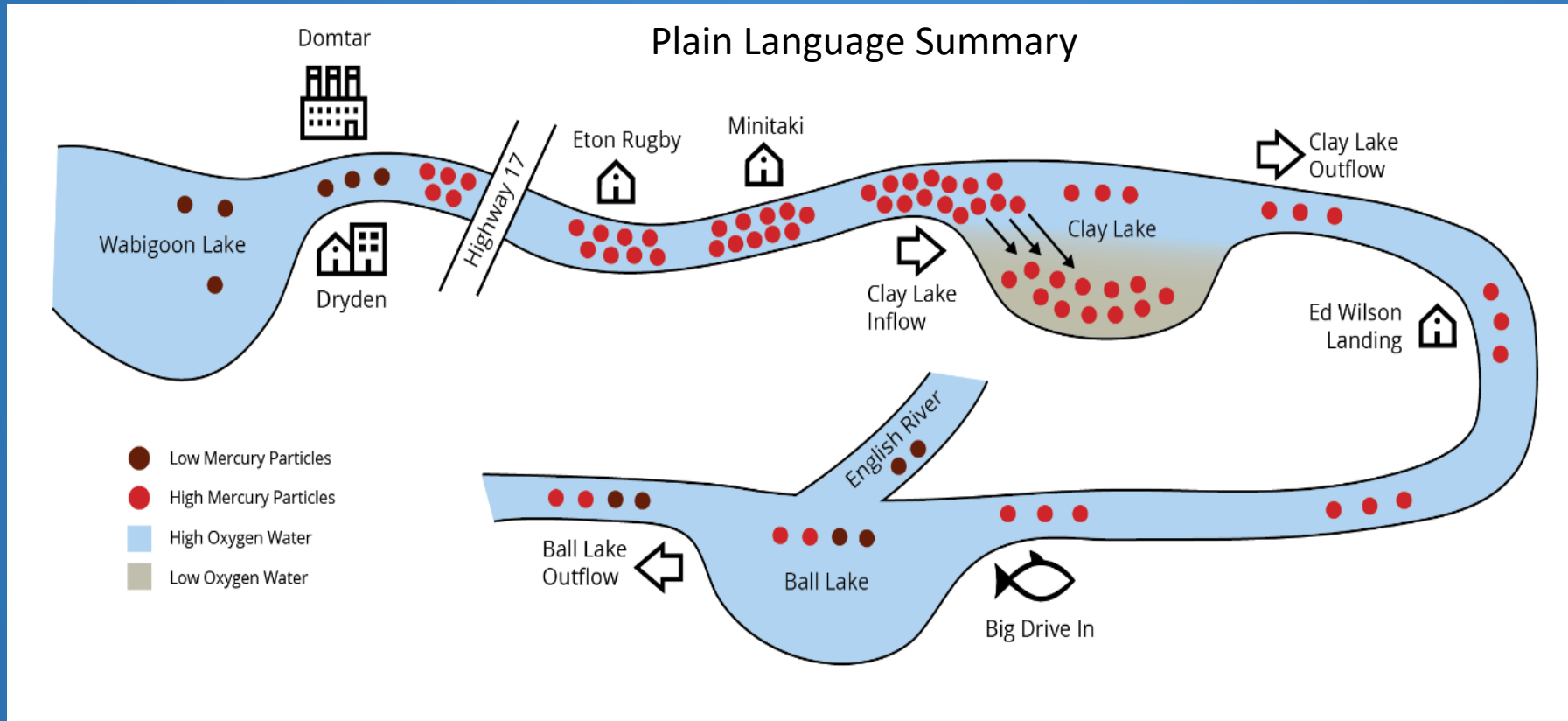
MeHg concentrations positively related to inorganic Hg concentrations



The English-Wabigoon is also not recovering after 50 years.



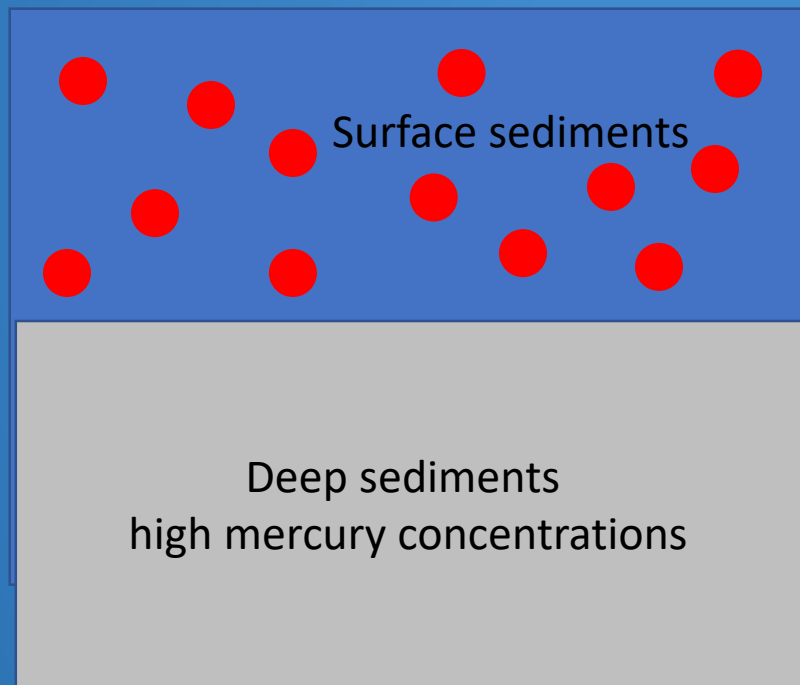
50 years later upstream mercury contamination still impacting Grassy Narrows people



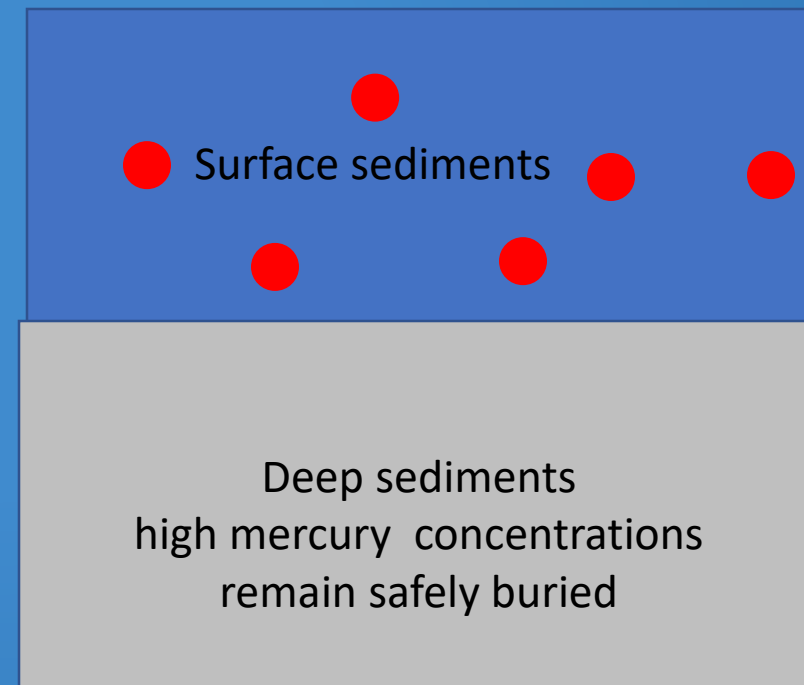
Remediation by addition of clean-clay which dilutes inorganic mercury in surface sediments where methylation occurs

2017

Before treatment



After treatment



● = mercury

Ontario announces \$85M to clean up mercury near Grassy Narrows, Wabaseemoong First Nations

New funding will go to First Nations-led plan for full remediation of English-Wabigoon River

By Jody Porter, [CBC News](#) Posted: Jun 27, 2017 6:56 PM ET Last Updated: Jun 27, 2017 8:20 PM ET



'This is a turning point,' says Ontario Environment Minister Glen Murray. (CBC)

Clay Lake 2017

