

New England Governors and Eastern Canadian Premiers Mercury Action Plan: 2006 Update

C. Mark Smith, PhD MS

**Massachusetts Department of Environmental
Protection**

Co Chair NEG-ECP Mercury Task Force



PRESENTATION OVERVIEW

1. Mercury still a regional priority
2. Brief background/history of MAP
3. Summary of progress on 2005-2007
MAP work plan priorities
4. Environmental results
5. Conclusions

Credits

- **MTF. Project Director:** John Shea (NEGC). **Co Chairs:** C. Mark Smith (MA); Stephanie D'Agostino (NH); George Haines (NB). **Representatives:** Robert Kaliszewski, CT; Gaetan Roy and Marie Dussault, Quebec; Judy Shope, MA; Ginger Jordan-Hillier, ME; Tom Neijadlik, NH; Debbie Johnston, PEI; Ron Gagnon/ Beverly Migliore, RI; Gary Gulka/ Richard Phillips, VT; Mark Glynn, NB; Peter Haring, Nfld.; Brent Baxter, NS; **Partners:** Terri Goldberg, NEWMOA; John Graham/Praveen Amar, NESCAUM; Ron Poltack/ Susannah King, NEIWPC; Jeri Weiss, U.S. EPA New England; Tonya Bender/ Cheryl Heathwood, Environment Canada; Luke Trip, CEC; Randy England, NJ; Barbara Nuffer, NY; Peter Petit, NY; Dave Evers, Biodiversity Institute/NE Research Collaborative
- **Past MTF participants:** Raynald Brulotte (PQ); Carmine DiBattista, Lois Hager, John Cimoskoski and Tessa Gutowski (CT); David Lennett, Ellen Parr-Doering, Kevin McDonald, Jim Brooks (ME); Glenda MacKinnon-Peters (PEI); Chris Recchia (VT); Margaret Round (NESCAUM)
- **MassDEP:** Carol Rowan West, Michael Hutcheson, Jane Rose, Oscar Pancorbo; Sarah Weinstein, Barbara Kwetz, Judy Shope, Azin Kavian, Charlie Mentos, Sharon Weber, Lori Segall, John Reinhardt, James Paterson, Mingyuan Pan; Caroline Ganley; Marc Cohen; Rick Dunn

MERCURY STILL A REGIONAL PRIORITY

1. NEG-ECP MAP continues to be implemented by all jurisdictions
2. A continued focus for interstate organizations: NEIWPC/NEISCAUM/NEWMOA
3. NE leadership on national issues: CAMR lawsuits/ Quicksilver caucus
4. Cross-border cooperation and coordination

MERCURY STILL A SIGNIFICANT REGIONAL PROBLEM

1. Mercury levels in fish from water bodies across region remain too high.
 - Preliminary MA/ME TMDL analyses support virtual elimination goal
2. National exposure data indicate >50,000 newborns at risk in northeast states each year
3. Regional economic costs of mercury health impacts alone may exceed \$1 billion/year (Mt Sinai and HCRA/NESCAUM)

Economic Impacts

Mt. Sinai School of Medicine Mercury Health Cost Study (2005)

- Costs from mercury exposure from all anthropogenic sources
- Only considered neurotoxicity (decreased IQ) in children
- US costs: \$2,200,000,000 – \$43,800,000,000/ year
- Costs per pound of mercury pollution (based on utility emissions): \$13,000 (range: \$1,000 - \$66,000)

Harvard Center for Risk Analysis/NESCAUM Study (2005)

- Addressed utility emissions only.
- Benefit estimate \$100,000,000 to \$5,000,000,000/ year
- \$1,500 to \$74,000 per pound of mercury emissions prevented.

Other Impacts Also Significant

- Direct exposures from mercury spills/
broken products
 - Frequent cause of calls to poison centers
 - School spill cleanups: up to \$250,000
 - MA public water system spill: > \$100,000
- Monitoring- data limited but
 - indoor air levels following a spill of 1 gram
(amt. in fever thermometer) can exceed
recommended levels for extended periods

WHAT IS BEING DONE?

Global

**United Nations Accords
UNEP Assessment**

Continental

**Commission for
Environmental Cooperation
North American Regional
Mercury Action Plan**

National

**Quicksilver Caucus; EPA
Mercury Action Plan?**

Regional

**New England Governors
/Eastern Canadian Premiers
Regional Mercury Action Plan**

State

**Massachusetts
State Zero Mercury Strategy**

NORTHEAST ACTION

New England Governors/ Eastern Canadian Premiers Mercury Action Plan

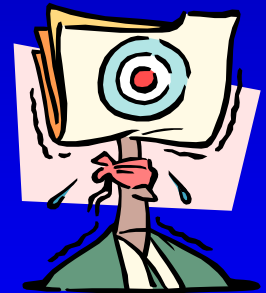
- Adopted in June 1998
- Goals
 - ◆ By 2003: 50% or greater reduction in emissions in the NE region
 - ◆ By 2010: 75% reduction
 - ◆ Long-term: virtual elimination
- Adaptive management through 2-year work plans
- Implementation through jurisdictional strategies/plans

NEG-ECP MAP History

- 1998 Regional NE States/Eastern Canadian Provinces Mercury Study
- Support crosses political lines in both US and Canada
 - Endorsed by Republican; Democrat and Independent Governors; 3 political parties in Canada
- Regional organizations critical to plans development and implementation:
 - NEG-ECP/ NESCAUM/ NEWMOA/NEIWPC
- Core group of state/provincial staff

Scope & Approach

- Strategic Approach:
 - Clean hands, lead by example
 - Scientifically informed precautionary principle
 - Multimedia: air, water, land
 - Pollution control and pollution prevention integrated
- Implementation:
 - Regional, multi-agency cooperation
 - Accountability
 - measurable goals and milestones;
 - deadlines
 - Adaptive management and prioritization
- Coordination and reporting framework: Task Force/Environment Committee
 - 2-year work plan and reporting cycle



2005-2007 Priorities

- Continue progress implementing regional strategy to achieve 2010, 75% reduction goal
 - key areas identified where further reductions needed to Implement Strategy
 - Utilities
 - Dental sector- wastewater and sludge
 - Products
 - Oil combustion
- School cleanouts
 - 50% 2007 target

2005-2007 Priorities (continued)

- Accountability measures: track environmental indicators to evaluate progress
 - Update deposition modeling to reflect emission reductions
 - Monitor mercury levels in fish and other biota
- National-international outreach/ capacity building
- Advance state/regional TMDL proposals
 - many water bodies likely will need reductions in inputs > 80% some >90%
 - MA/ME/RI alternative proposals

The Mercury Cycle

OVERALL PROGRESS

NE regional actions far exceed federal requirements.

Major progress in:

1. Pollution control: municipal waste incinerators; medical waste incinerators; utilities; dental sector

2. Pollution Prevention: product labeling; reporting; sales bans; take-back requirements

3. Monitoring



UTILITY SECTOR UPDATE



- Action Plan Objective:
 - Maximal feasible reductions
- Current priorities: implement regulations and other commitments
- NB/NS switch to lower Hg fuel complete: emissions reduced by about 10% regionally
- MA regulations: emission limits take effect in 2008 (85% control) and in 2012 (95% control);
- CT legislation: 90% control by 2007
- NB facility to upgrade APCDs by 2012
- NH legislation under consideration

DENTAL SECTOR UPDATE

- Dental amalgam waste significant source of mercury releases regionally (50% of Hg to wastewater)
 - Amalgam separators can reduce discharges by >95% at modest cost (< \$300 yr/dentist)
- Regional Goal: 50% with amalgam separators installed by 2005; 75% by 2007; 95% by 2010
- Regionally at >66%
 - Hundreds of lbs hg pollution prevented

MERCURY PRODUCTS UPDATE

- Action Plan Objectives
 - Reduce/Eliminate Nonessential Uses
 - Segregate and Recycle
- Extensive Action across region
 - CT; RI; VT; ME; NH: implementing comprehensive products legislation. MA: comprehensive legislation passed this spring by senate/house
 - Many other programs with > 8,500 pounds recycled in region
 - IMERC now national with MN; CA; WA; IL joining



OIL COMBUSTION UPDATE

- Heating a large regional sources of estimated current mercury emissions....mostly from oil combustion
- However, emissions estimate very uncertain
- Regional effort underway to improve emissions value and explore reduction options
- Working hypothesis is that low sulfur fuels will contain lower levels of mercury

MERCURY-FREE SCHOOLS UPDATE

- 2005-2007 work plan adopted 50% target for HS mercury cleanouts 2007
- To date large quantities of mercury collected
 - Regionally, > 3,000 pounds collected; 70 pound flasks
- Provinces complete; some states complete others well underway



NATIONAL-INTERNATIONAL OUTREACH/ CAPACITY BUILDING

- Share information and help expand strategic policy development and implementation
- Advise/ advocate for more aggressive national and international efforts
 - CAMR lawsuits
 - Leadership roles on Quicksilver Caucus
 - Participation in CEC mercury NARAP
- Global mercury meeting in WI

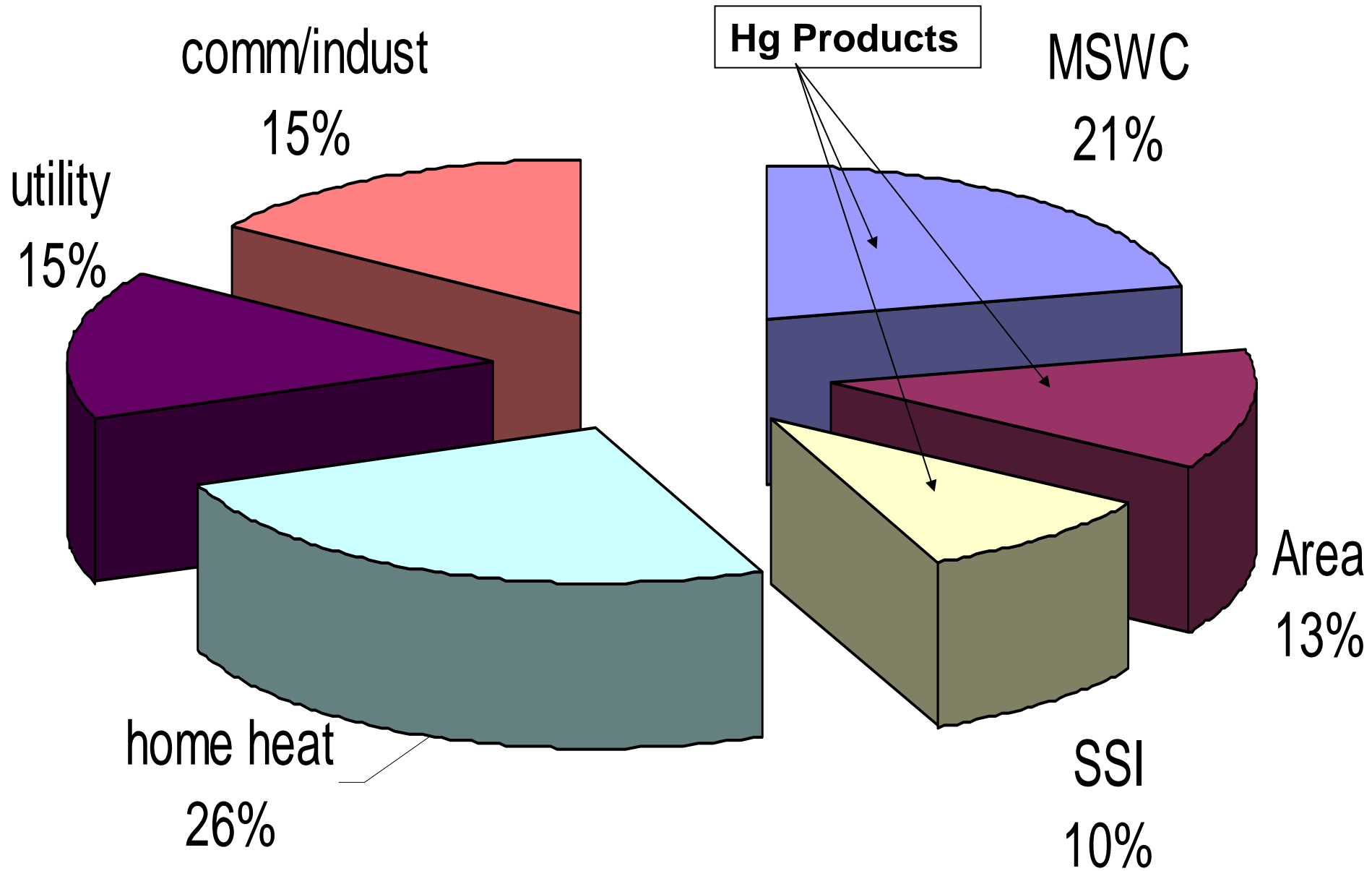


ACCOUNTABILITY MEASURES AND MONITORING UPDATE

- Emissions inventory
- Regional mercury deposition modeling
 - Baseline vs., 2003 inventory using same model and modeling parameters
- Biota monitoring
- MA hotspot study



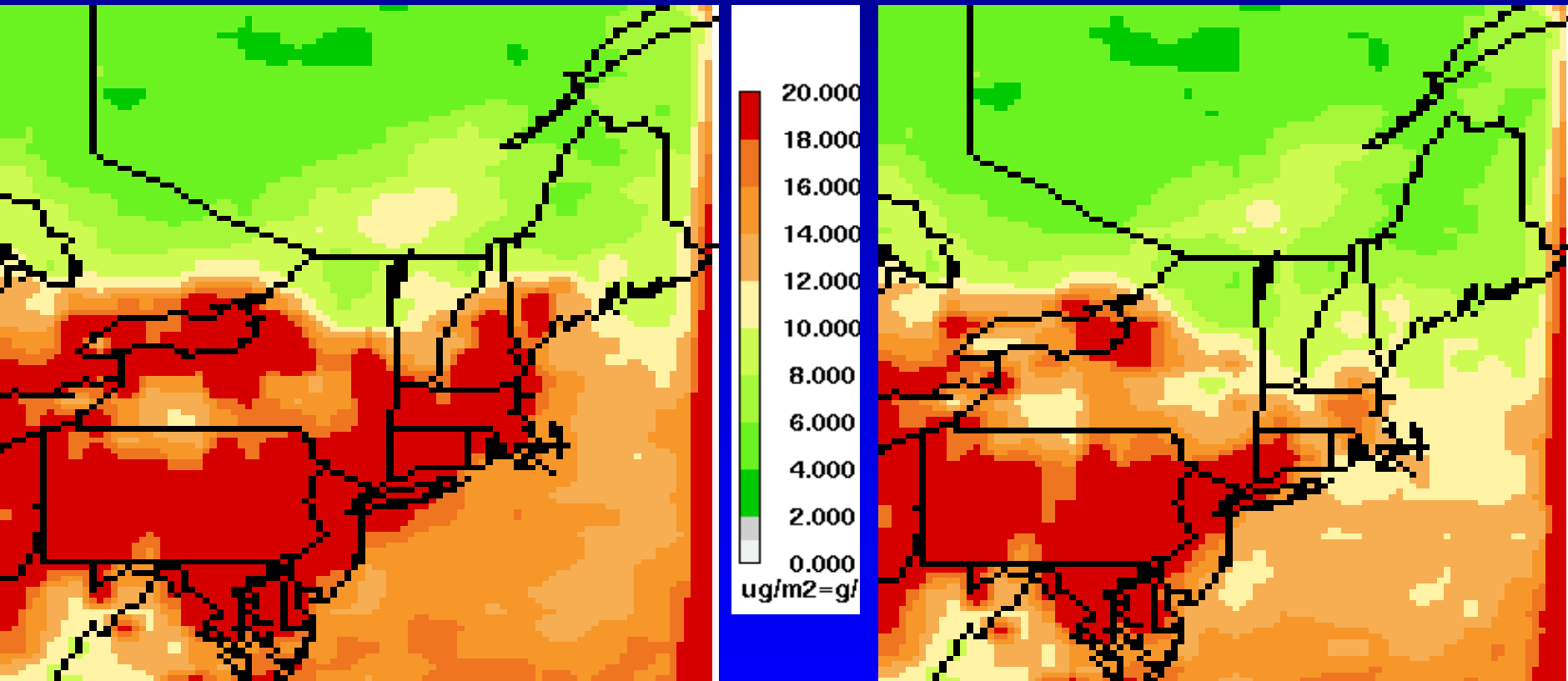
Remaining NE/ECP Sources: 2003



Total Mercury Deposition

Pre NEG-ECP Mercury Action
Plan (1996 Northeast Hg
Emissions)

Post NEG-ECP Mercury Action
Plan (2002 Northeast Hg
Emissions)



Based on REMSAD model using 1996 and 2002 Northeast emission
inventory data. Draft, December 2005.

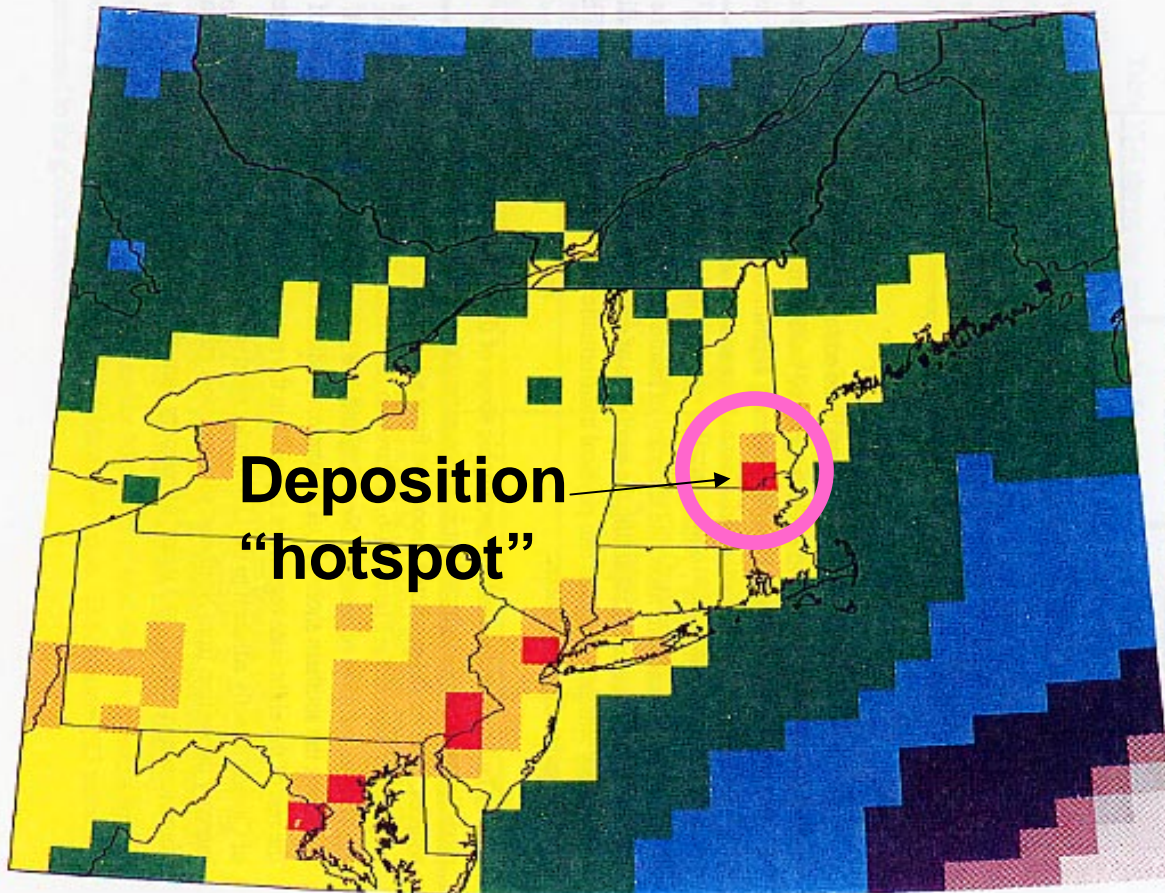
DATA INDICATE FAIRLY RAPID IMPROVEMENT IN MERCURY LEVELS IN BIOTA (details to follow)

- Mercury levels in loons lower
- MA fish monitoring data demonstrates statistically significant reductions in mercury levels in largemouth bass and yellow perch
- Reductions largest in deposition “hotspot” area (20-30% overall)



MA Deposition Hotspot Monitoring

Figure VI-5
Annual Wet and Dry Hg Deposition
All U.S. Inventory Sources
($\mu\text{g}/\text{m}^2$)



Yellow= 10-30 $\mu\text{g}/\text{m}^2$
Lt red= 30-100
Red= >100



Northeast Total
Deposition
(1998 NE
Regional
Mercury Study)

Modeled vs Measured Mercury Wet Deposition in MA Hotspot

	1998 Modeled Deposition (ug/m2)	2005 Modeled Deposition (ug/m2)	2002 Measured Wet Deposition (ug/m2)
N. Andover	135	14.5	10.7
MA overall	27	14	8.8 (Quabbin)

Estimated Mercury Emissions: MA Statewide and Hotspot Dep. Area

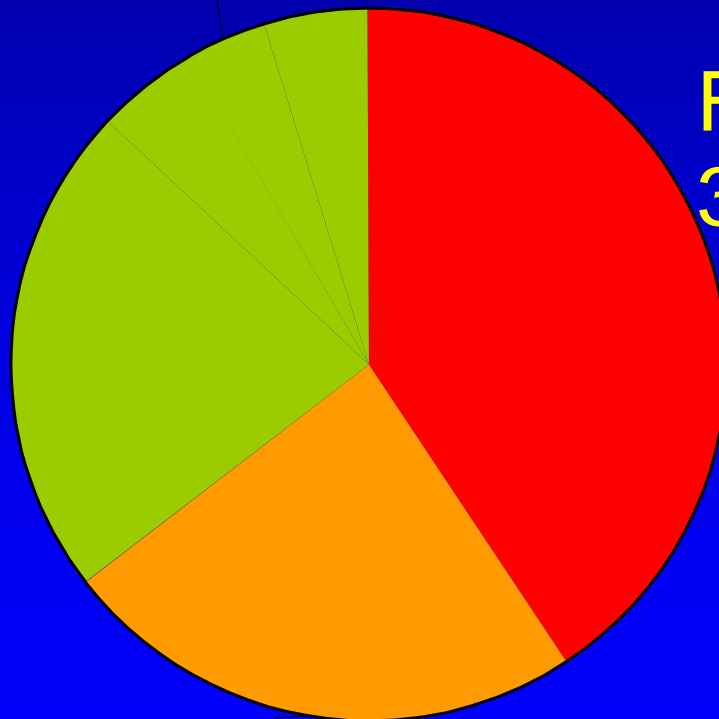
	Baseline (lbs/year)	2002- 2003 (lbs/year)	Estimated reduction
MA	8,600	2,540	70%
High Dep	4,100	540	87%

Hg Source Contributions: Quabbin (2002-2003)

Other: 37%

Fossil Fuel:
39%

Waste Incinerators: 24%



CONCLUSIONS



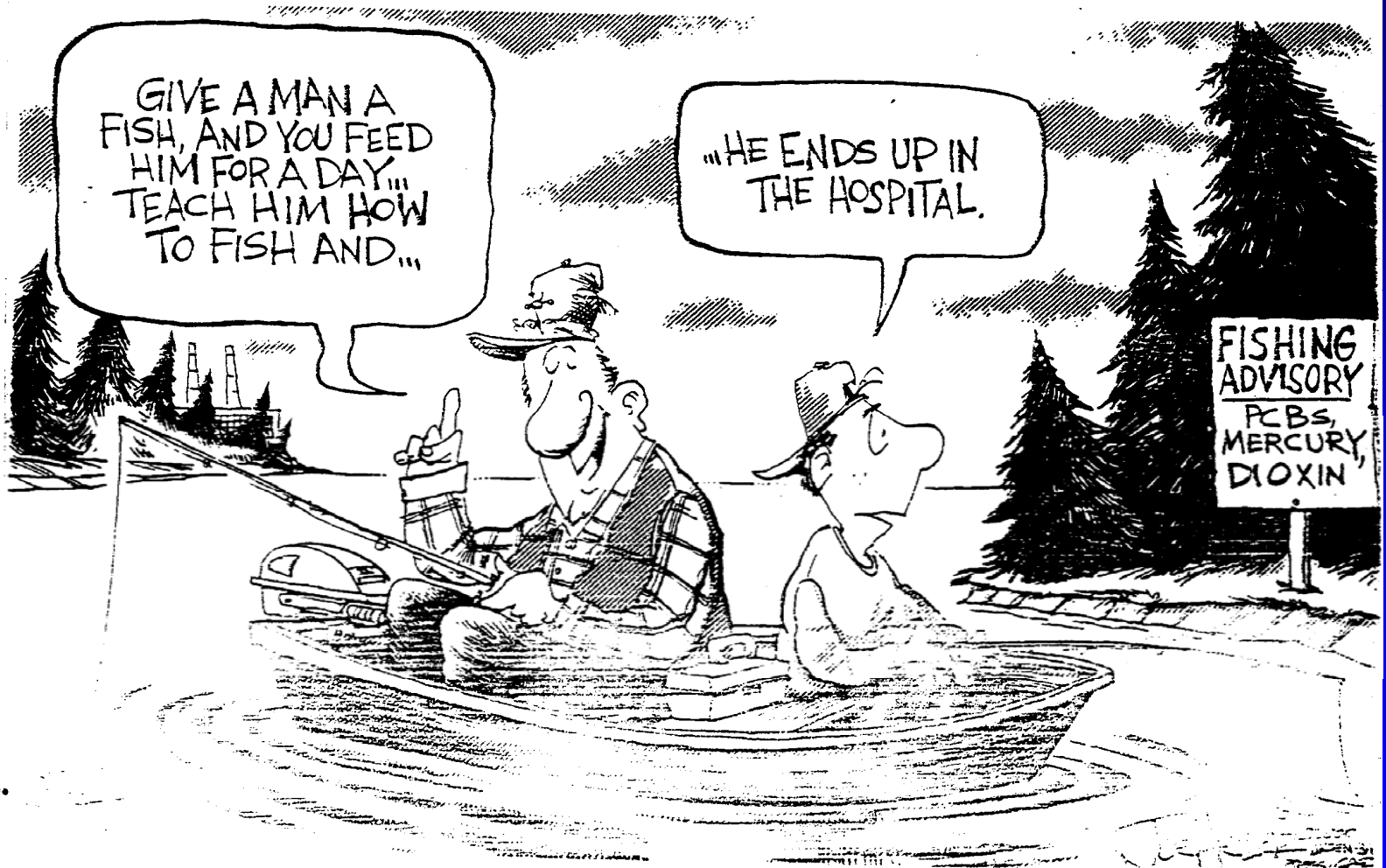
- NEG-ECP MAP has effectively reduced regional emissions
 - Substantial progress
 - Region on course to meeting 2010 75% reduction target
- Environmental indicators indicate real improvement: regional deposition reduced and mercury levels in fish/loons down
 - But fish still unsafe
- Further reductions needed including from out-of-region sources to meet water quality objectives

Heller's view

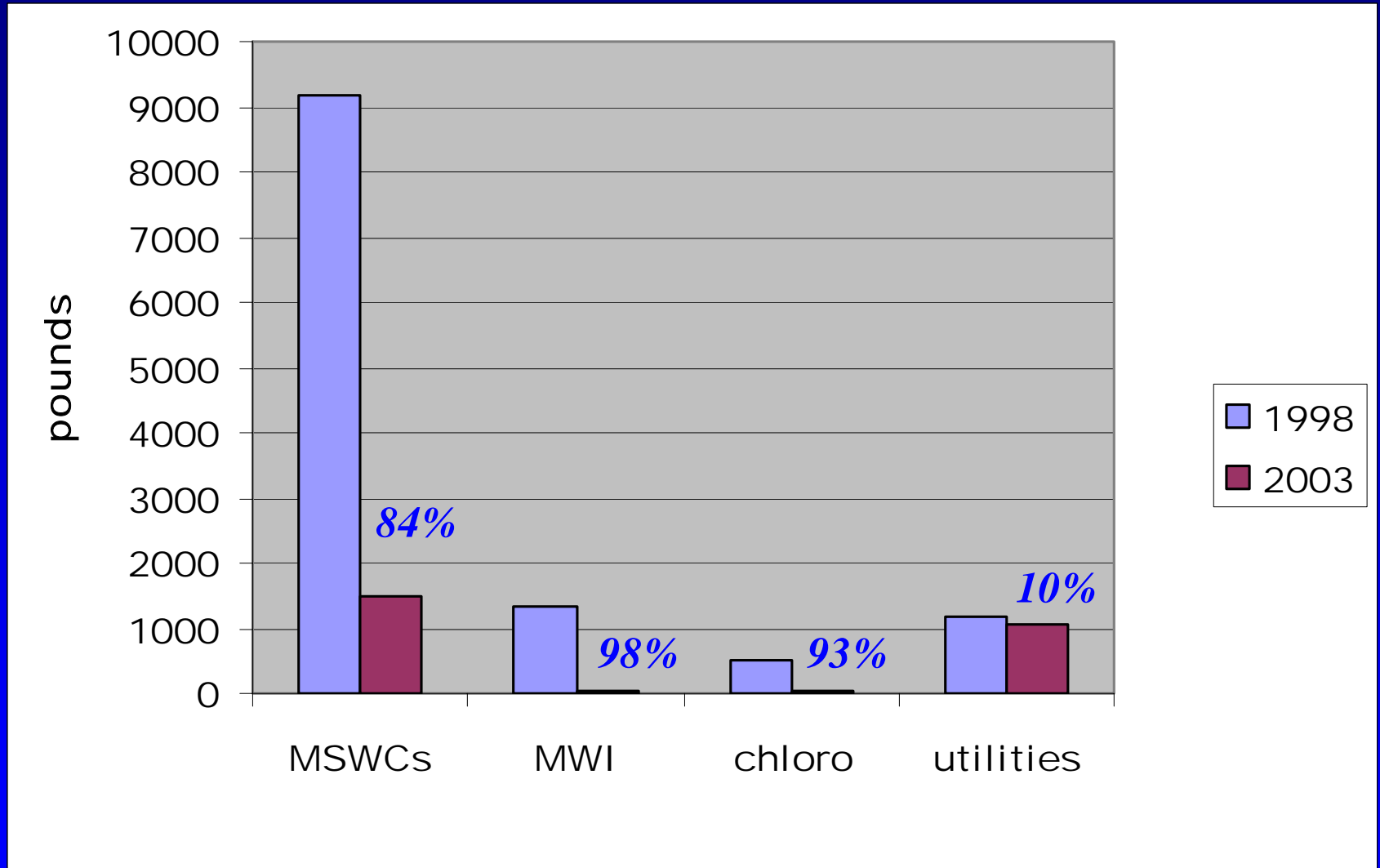
GIVE A MAN A FISH, AND YOU FEED HIM FOR A DAY...
TEACH HIM HOW TO FISH AND...

...HE ENDS UP IN THE HOSPITAL.

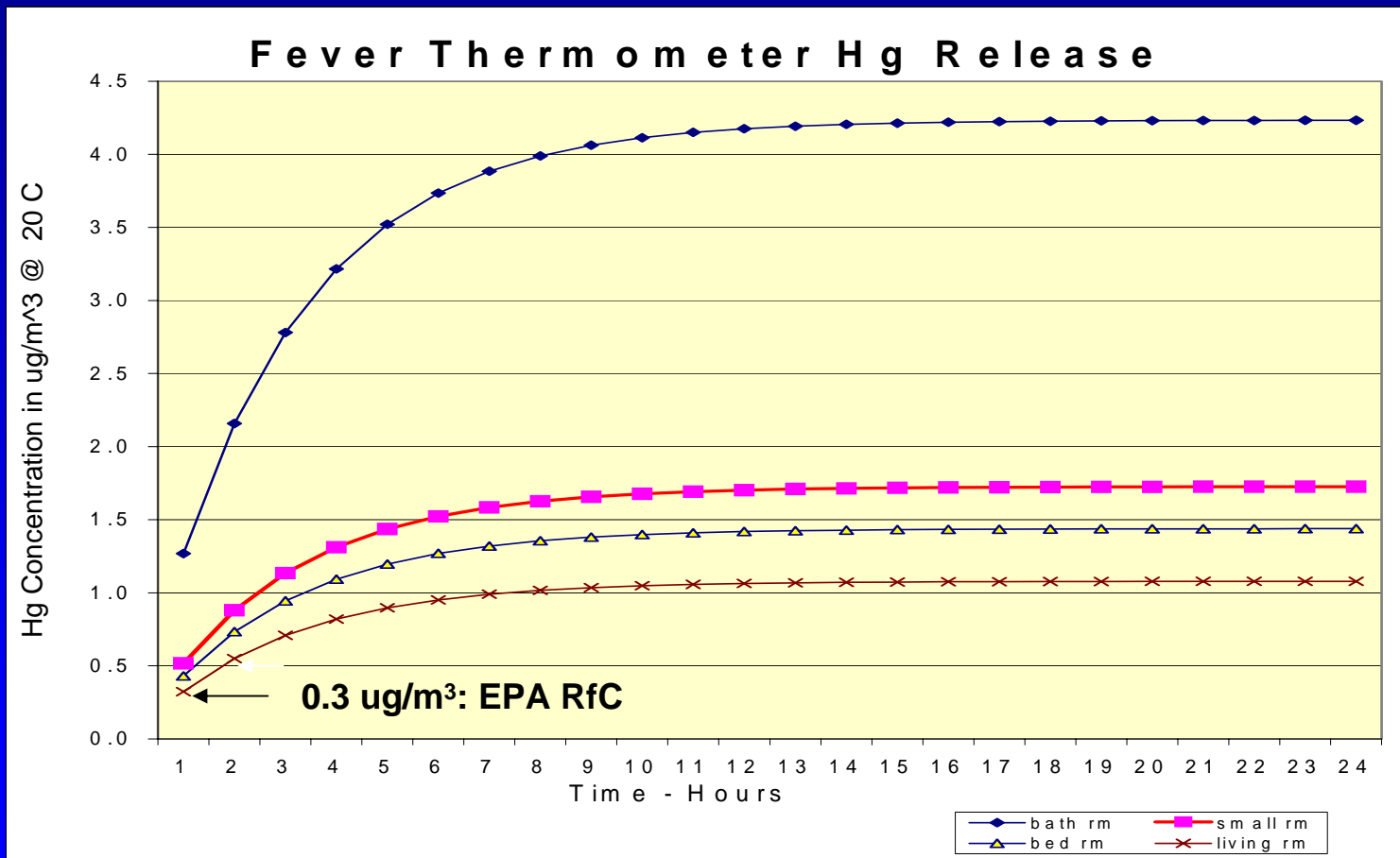
FISHING ADVISORY
PCBS,
MERCURY,
DIOXIN



REGIONAL EMISSION REDUCTION ESTIMATE: 54%



Predicted Indoor Air Concentrations Following a Spill of 1 Gram of Elemental Mercury

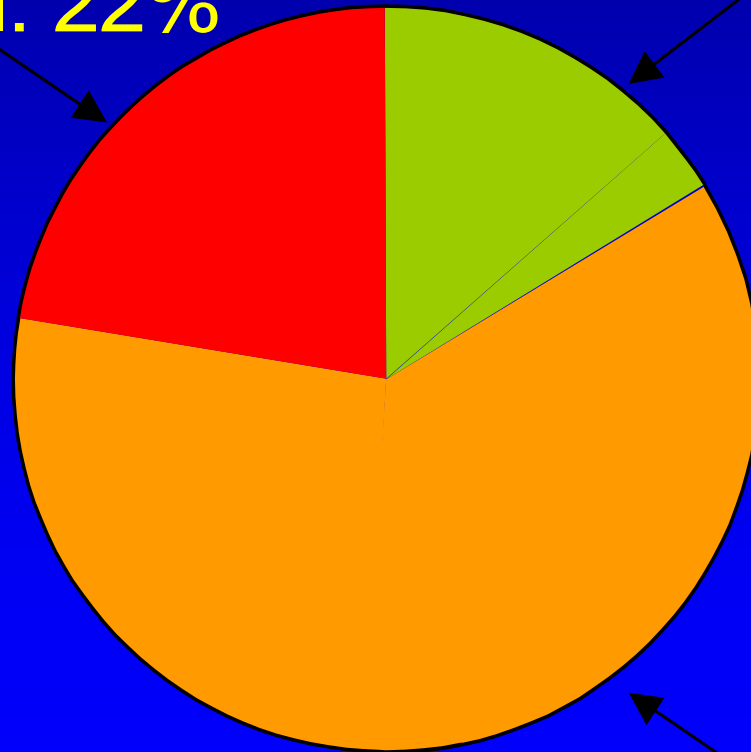


At an evaporation rate of 12.32 $\mu\text{g/hr}$, it would take 9 years for 1 gram of mercury to completely evaporate.
Analysis by John Fitzgerald, MassDEP

Hg Source Contributions: N. Andover (2002-2003)

Fossil
Fuel: 22%

Other: 19%



Waste Incinerators: 59%

NEW ENGLAND MERCURY DEPOSITION MODELING

Contribution of emission sources to New England mercury deposition.

	<i>US Sources</i>		<i>All Sources</i>	
	1998	2005	1998	2005
In region:	86%	57%	51%	19%
Out-of-region:	14%	43%	49%	81%

Preliminary results. NESCAUM.
Based on REMSAD model.

Amalgam Separator Use in NE And the ECP– June 2005

Jurisdiction	Dentists/practices	# with separators	% with separators
Nfl & Labrador	not reported but very small #		100%
Prince Edward Island	36 practices	34	95%
Maine	340 dentists	323	95%
New Hampshire	*450 practices	* 427	* 95%
Nova Scotia	225	169	75%
Massachusetts	3600 dentists	2660	74%
Connecticut	2200 dentists	1646	64%
New Brunswick	280 practices	126	45%
Quebec	about 1,889	850	45%
Rhode Island.	320 dentists	83	25%
Vermont	254 practices	38	15%
Total	**about 9,594	**6356	About 66%

Mercury in Mink and Otter Fur

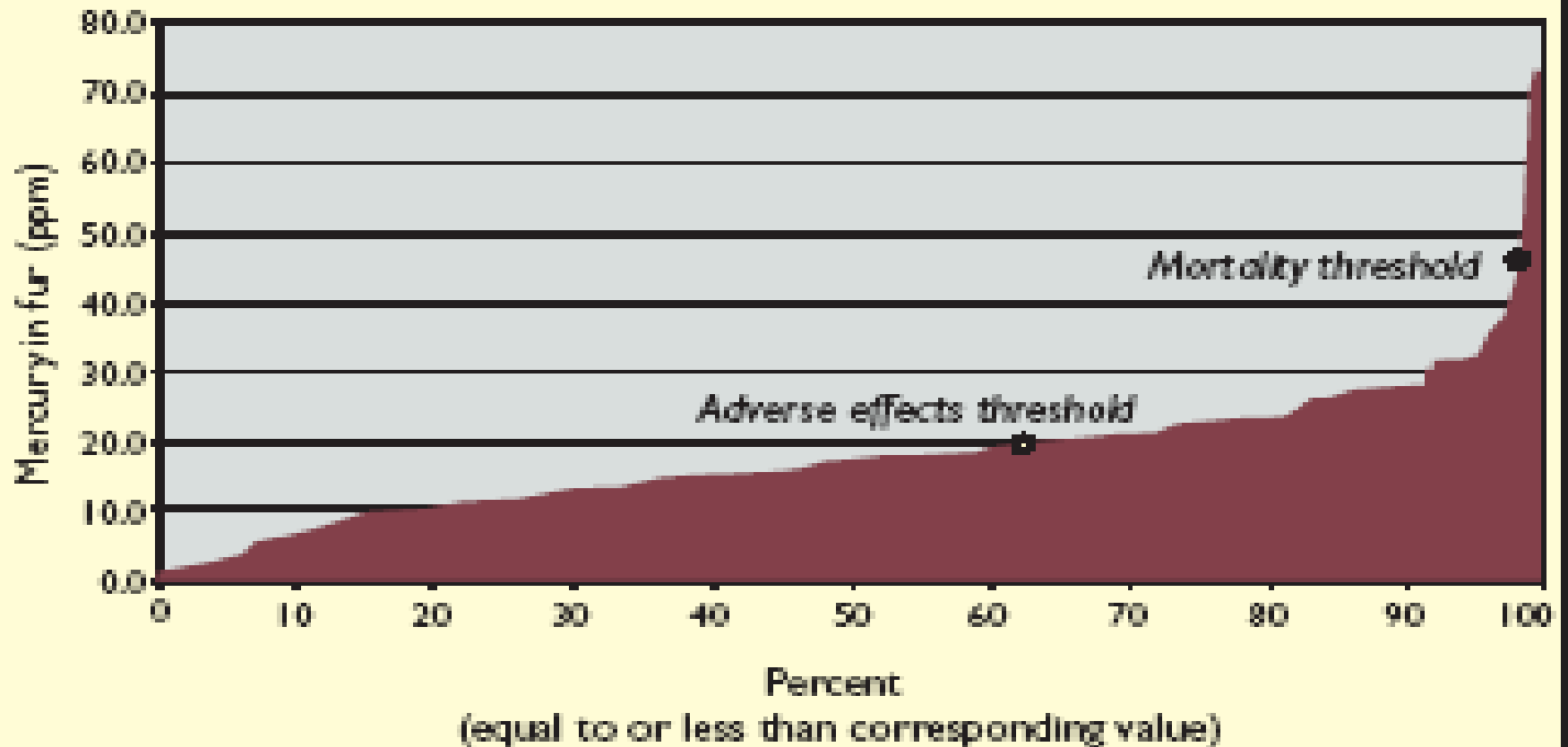


Figure 12: Mink and otter data show that 36% of the animals sampled exceed the threshold for adverse effects and 1% exceed the threshold for acute toxicity leading to death.