Lake Superior
2005 Chemical Milestones

Carri Lohse-Hanson
Minnesota Pollution Control Agency
651-296-9134 carri.lohse-hanson@pca.state.mn.us

Purpose

- Background of Zero Discharge
- What the milestones report inventory tells us
- Levels and trends in Lake Superior
- Meeting the next set of milestones

Source: http://www.winona.edu

The Zero Discharge Goal

- Challenge issued at 1989 IJC biennial meeting
- Governments created a *Binational Program to Restore and Protect the Lake Superior Basin* in 1991
- 1991 agreement states “The goal is to achieve zero discharge and zero emission of certain designated persistent bioaccumulative chemicals that may degrade the ecosystem of the Lake Superior basin.”

The Nasty Nine

- Chlordane
- DDT
- Dieldrin
- PCBs
- Dioxin
- Hexachlorobenzene
- Mercury
- Octachlorostyrene
- Toxaphene

Lake Superior Zero Discharge Demonstration Program

- Major focus of Superior Work Group Chemical Committee
- Lakewide Management Plan (LaMP) Stage 1 (1995): problem identification
- LaMP Stage 2 (1999): reduction schedules
- LaMP 2000: Stage 3 for Chemical LaMP
- 2005 Milestones Report: progress reporting and next steps for 2010

Stage 2 Reduction Schedules

Chemical	base line	2000	2005	2010	2015	2020 (Zero)
mercury	1990	60%	70%*	80%		100%
PCBs	1990	33%	60%	95%		100%
dioxin/ HCB/OCS	1990		80%		90%	100%
pesticides	NA	100%				

* extrapolated (i.e., halfway between 2000 and 2010 milestones)

Milestones Report in a Nutshell

- Mercury discharges and emissions have been reduced 71% from 1990 levels
- Dioxin has been reduced 76-79% since 1990
- PCBs are being decommissioned in Ontario and the states
- Waste pesticide collections are still bringing in banned pesticides (12,700 kg in MN and WI since 1992)
- Most toxic chemicals measured in Lake Superior biota have declined

Mercury

Figure 3-1. Reductions of Mercury Discharges and Emissions from Lake Superior Sectors Between 1990 and 2005, kg/yr.

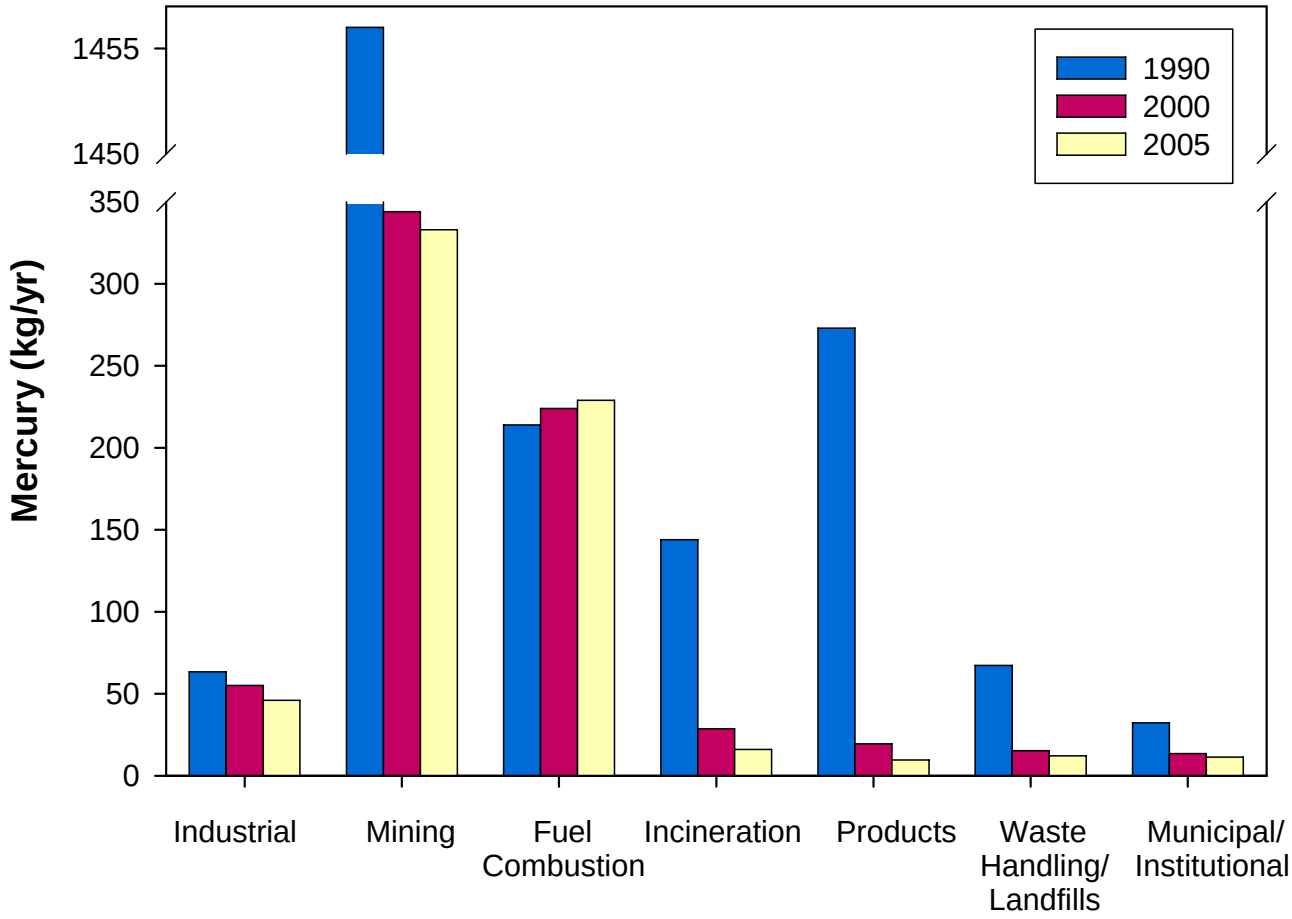
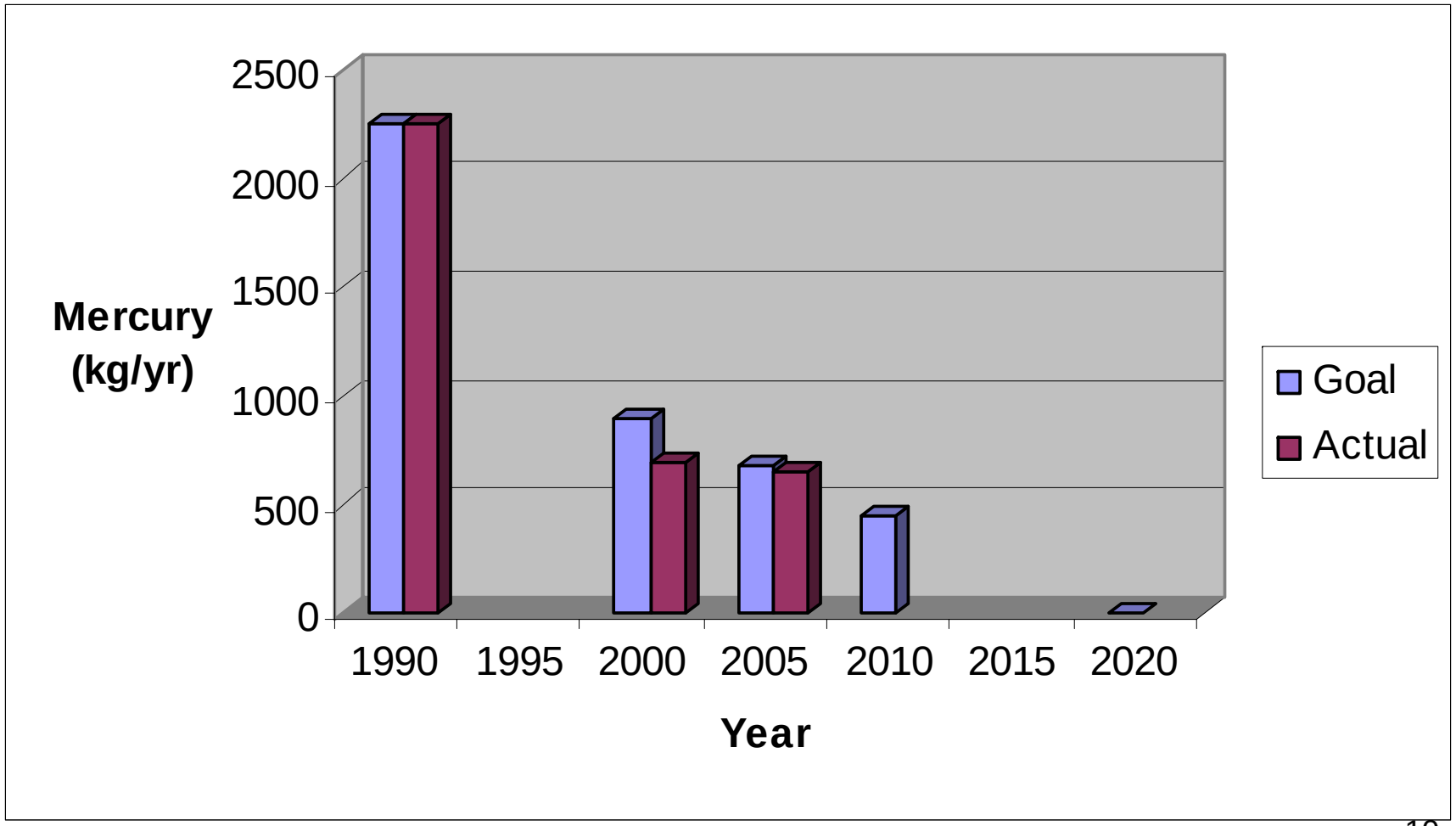
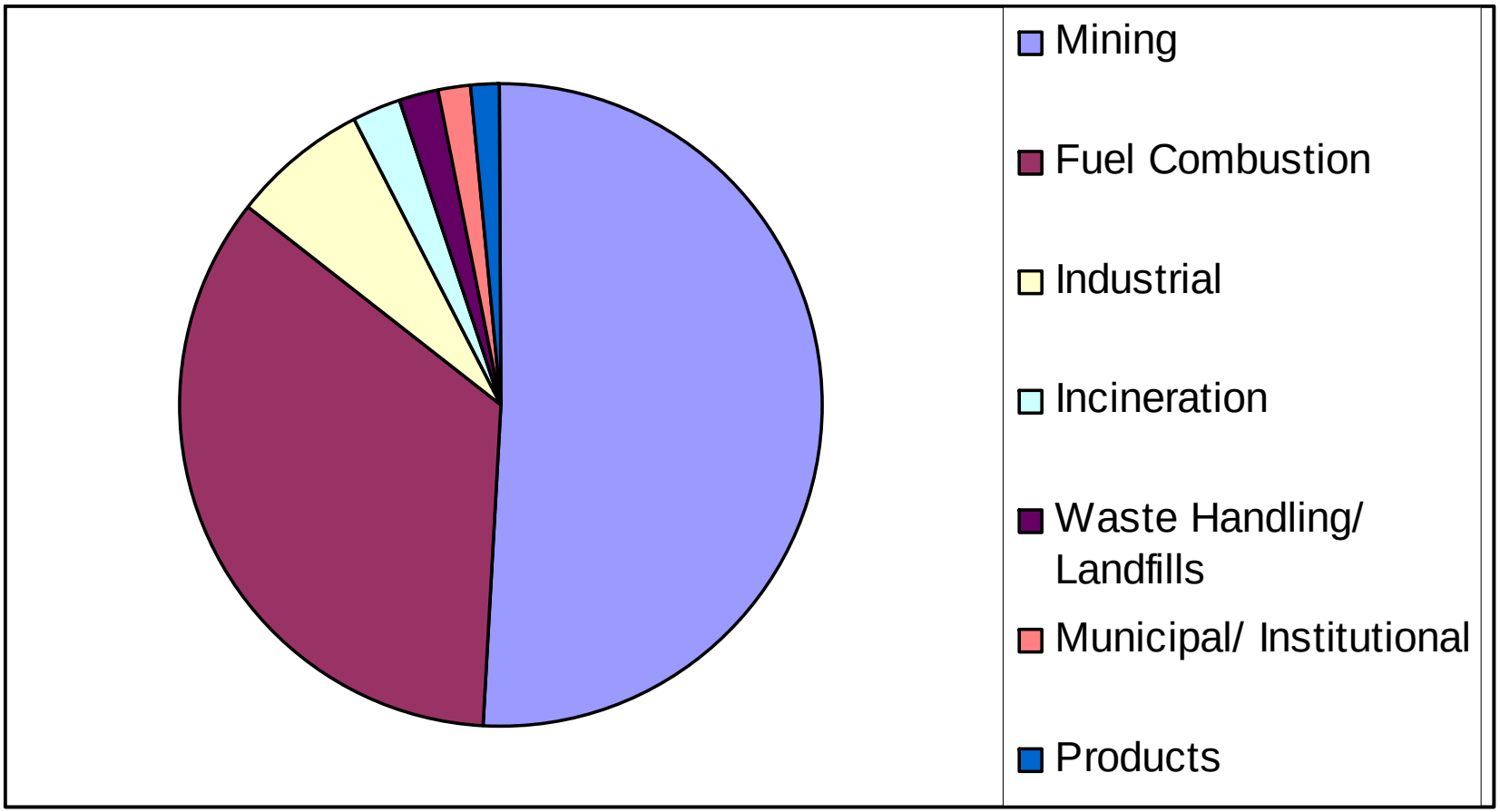


Figure 3-2. Actual Reductions of Mercury Discharges and Emissions from Lake Superior Sources Between 1990 and 2005 Compared to the Stage 2 Load Reduction Goals, kg/yr.



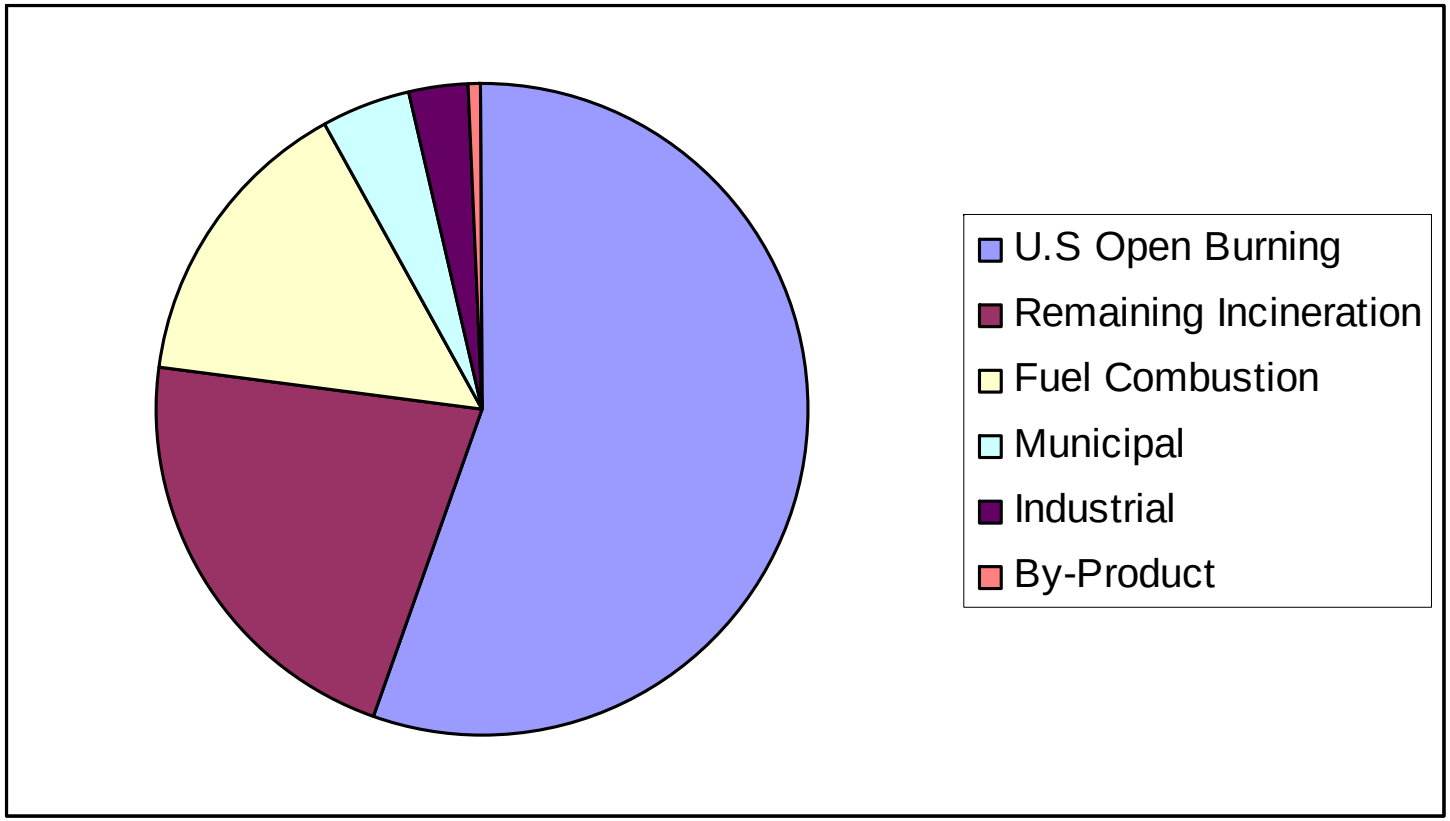
Note: a reduction of 200-207 kg (440-460 pounds) is needed to make the 2010 milestone of 80% reduction.

Figure 3-3. Percentage of Mercury Releases from Different Sectors in the Lake Superior Basin, 2005.



Dioxin

Figure 3-4. Percentage of Dioxin Releases from Different Sectors in the Lake Superior Basin, 2005.

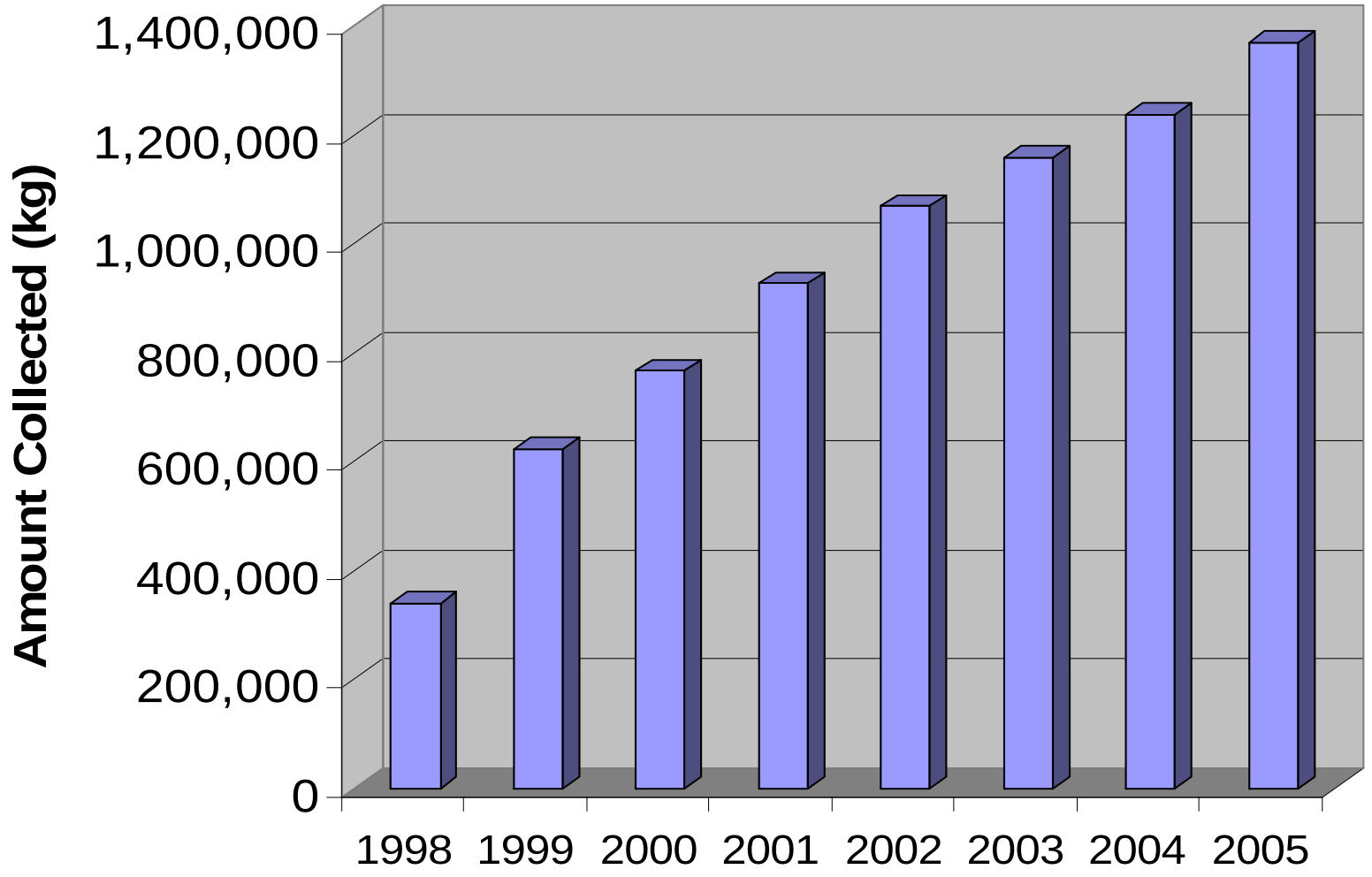


Note: A reduction of 3.1-4.0 g I-TEQ/yr is needed to make the 2015 milestone of 95% reduction.

U.S. Open Burning is estimated to be 3.9 g I-TEQ/yr.

PCBs

Figure 3-5. Cumulative Total of PCB Wastes Disposed from Minnesota Lake Superior Facilities*, 1998-2005



* Does not include Bayside Recycling 2004 shredder incident.

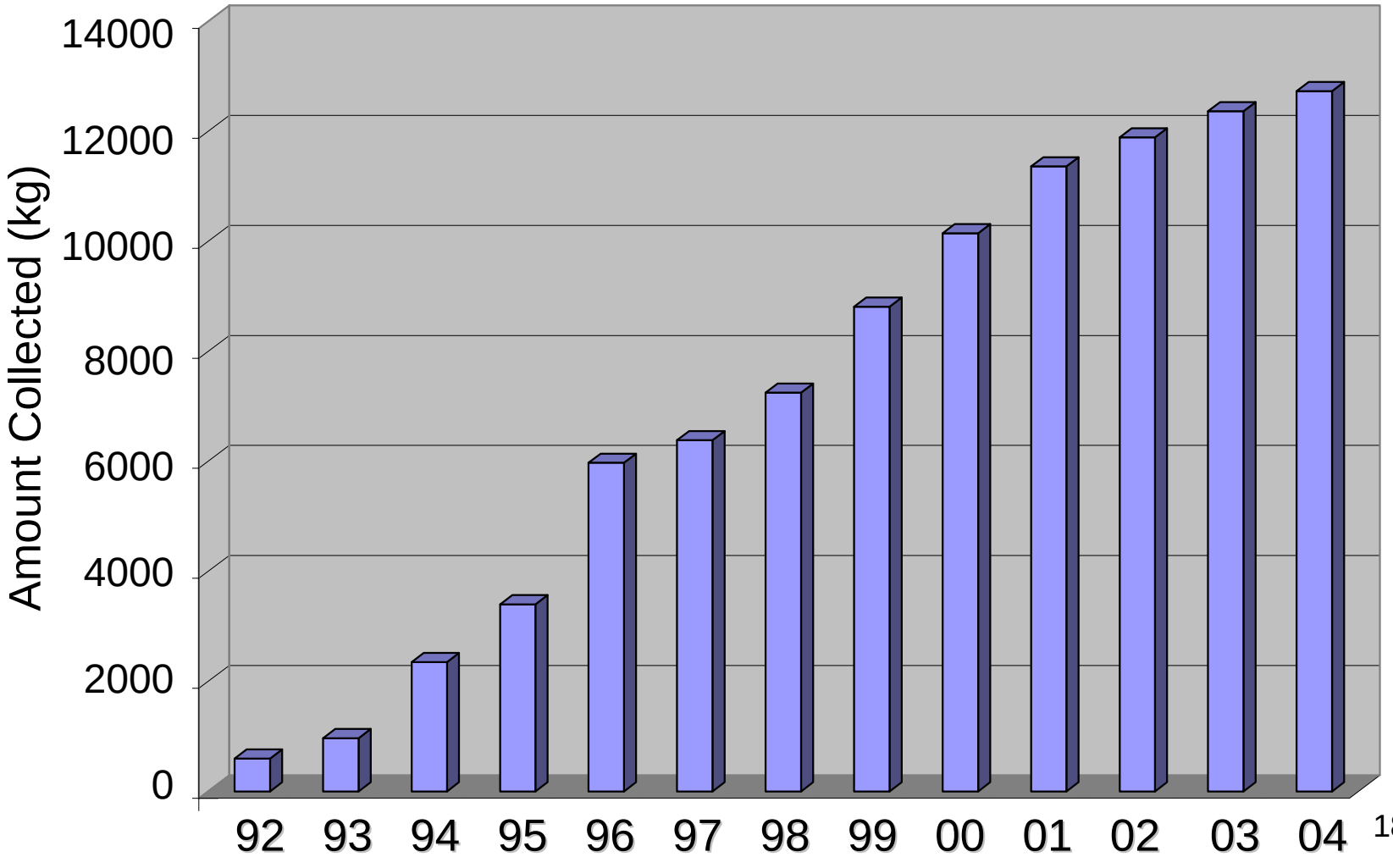
Minnesota PCB transformer project

Grand Marais linemen

- Used manufacturing data to identify “suspect” transformers at 4 small utilities
- Removed 450 suspects
- Generated data base that could be used by other utilities for inventory purposes

Pesticides

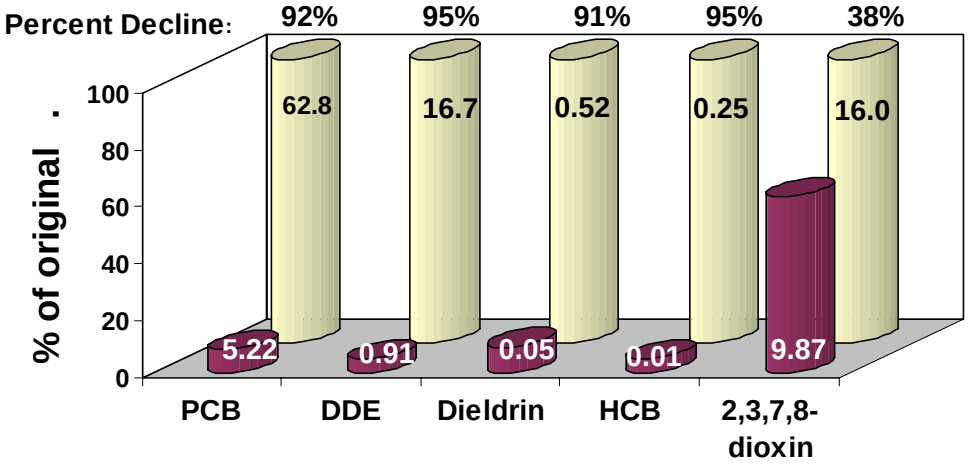
Figure 3-8. Cumulative Amount of Pesticides Collected in Minnesota and Wisconsin Counties in the Lake Superior Basin, 1992-2004 (kg).



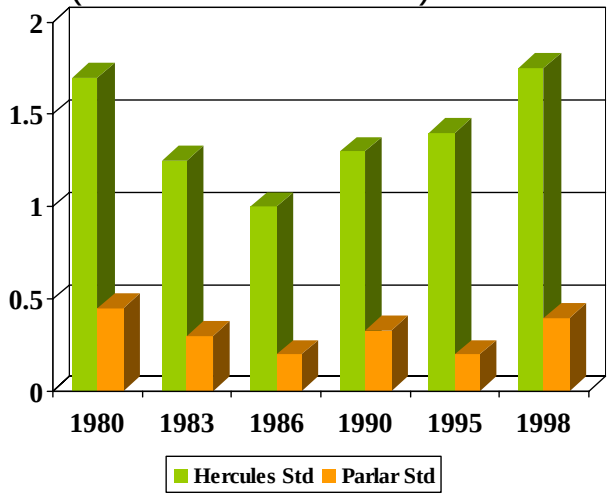
Contaminant Levels and Trends

Three Examples

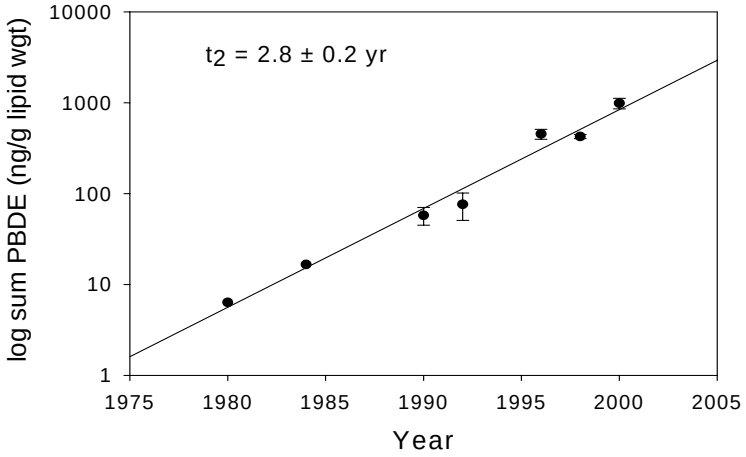
Legacy contaminants are decreasing in gull eggs (1974-2004)
(source: Weseloh and Havelka)



Toxaphene in lake trout has no clear trend
(source: Whittle *et al*.)



PBDEs in lake trout are increasing
(source: Zhu and Hites)



How do we meet these challenges?

- The 2010 mercury milestone requires an additional 200 kg/yr reduction.
- The 2015 dioxin milestone requires a reduction of 3.1-4.0 g I-TEQ/yr.
- We still need a way to measure progress in reducing PCBs.
- Collections within the basin continue to bring in waste pesticides.
- We need to stop the increase of emerging contaminants at the same time that we are studying their toxic effects.

Acknowledgements

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- The Chemical Committee also appreciates contributions to the Milestones report from staff at Bad River Band, Environment Canada, Fond du Lac Band, GLNPO, Grand Portage Band, Keweenaw Bay Indian Community, MDEQ, MOE, Red Cliff Band and WDNR.

- Contact Carri Lohse-Hanson at 651-296-9134 or Kate Taillon at 416-739-5989 for a copy of the milestones report or find it at http://www.epa.gov/glnpo/lakesuperior/2006/lschemmiles.pdf