MERCURY EVENT AGENDA 1/3/02

- Mercury Task Force
  - Findings
  - Recommendations
  - Report Release
- Mercury Switch Recovery Partnership Program
- Low or Mercury-free Product Awards

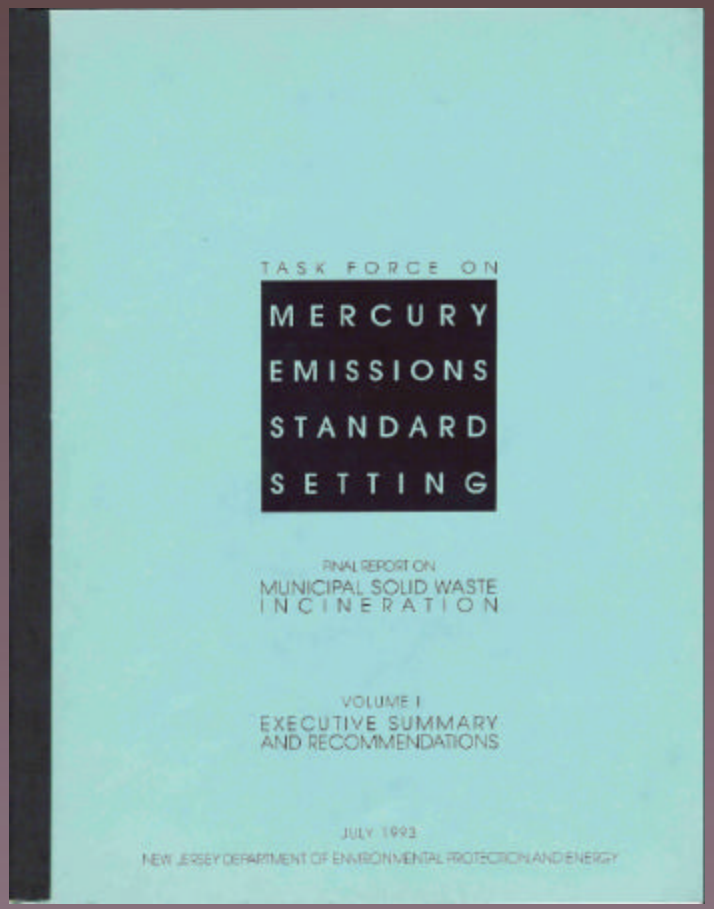
FIRST MERCURY TASK FORCE

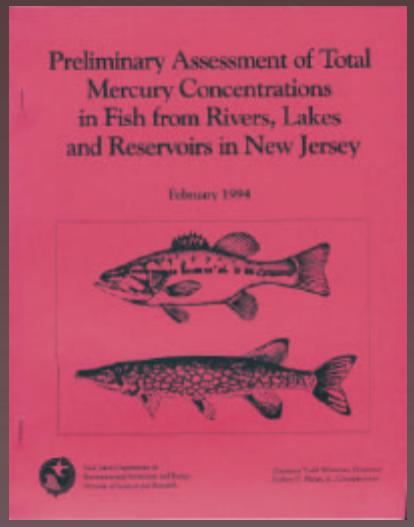
- Convened - April, 1992

- Focus on municipal solid waste incinerators (MSWIs) source category

- Report released - 1993

- Resulted in emissions standards and substantial reductions (>90%) in MSWI emissions

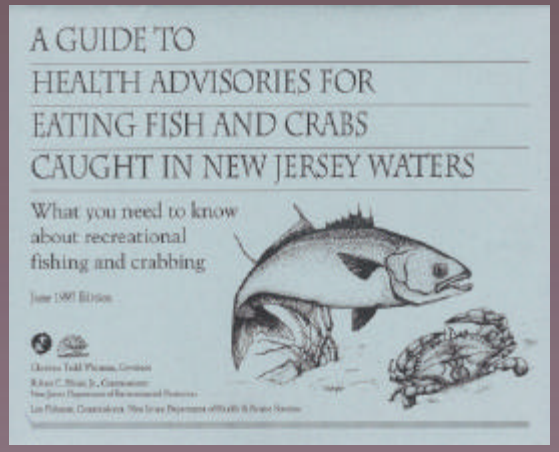




Mercury Follow-up Studies
A. Fish Consumption

- Fish tissue research - 1994
- Human health risk assessment

- Advisories issued
  - statewide - Largemouth bass, Chain pickerel
  - waterbody-specific



Mercury Follow-up Studies

B. Private Wells

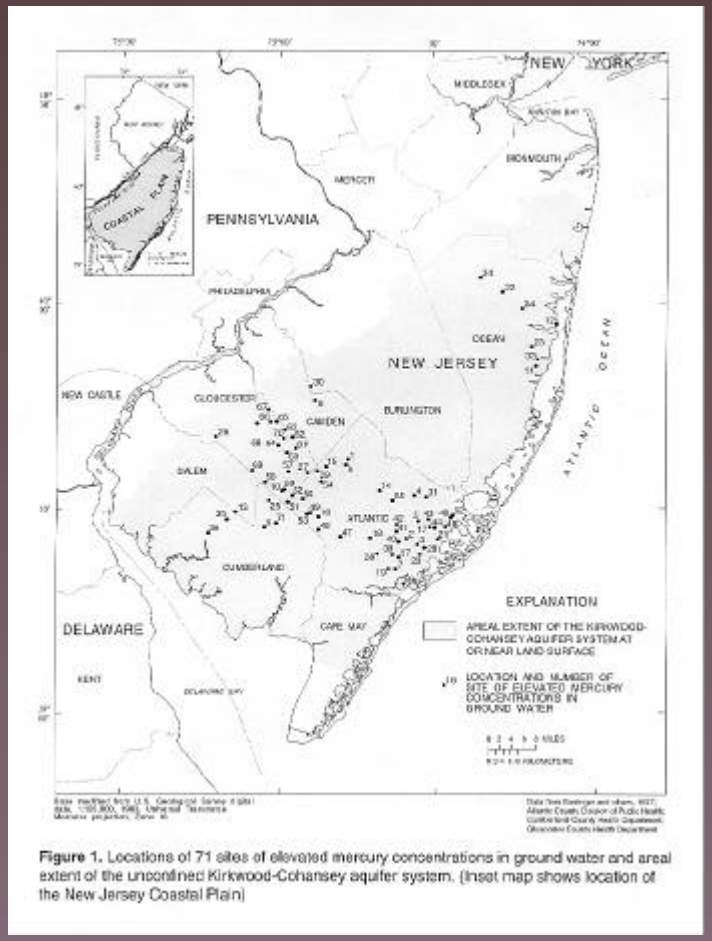


Figure 1. Locations of 71 sites of elevated mercury concentrations in ground water and areal extent of the unconfined Kirkwood-Cohansey aquifer system. (Inset map shows location of the New Jersey Coastal Plain)

- Approximately 400 wells in Kirkwood-Cohansey Aquifer System known to have mercury concentrations >drinking water standard (2 ppb)

- No known conclusive source(s) for these Hg levels
  (Hg was used in household paints, pharmaceuticals & pesticides.)

Second New Jersey Mercury Task Force

- Triggered by findings of fish tissue and private well research

- Broad evaluation of sources and reduction plan

Task Force Objectives and Charges

NJDEP Commissioner
Robert C. Shinn

ADMINISTRATIVE ORDER 1998-08

The Task Force is directed to complete the following tasks:

1. Review the current science on: a) impacts of mercury pollution on public health and ecosystems; and b) mercury deposition, transport, and exposure pathways

2. Inventory and assess current sources of mercury pollution to the extent feasible, including both in-state and regional sources of mercury pollution

3. Utilizing available information, quantify mercury pollution's impact on New Jersey's ecosystems, public health, and tourism and recreation industries

4. Review New Jersey's existing mercury pollution policies

5. Develop a mercury pollution reduction plan for the State of New Jersey.

Mercury Task Force Participants

Original Administrative Order Members

NJDEP Representative
*****Leslie McGeorge

Department of Health & Senior Services Representative
*****Jim Blumenstock

Board of Public Utilities Representative
*Brian Beam

Public Interest Group Representatives
*Dolores Phillips, Center for the Environment and Public Health Policy

Ashok Gupta, Natural Resources Defense Council

John Guinan, NJ Public Interest Research Group

Nevil Cohen, INFORM

Coal-fired Generators:
Eric Svenson, PSEG

Dan Cunningham, Conectiv (resigned)

Michael Jones, U.S. Generating

Independent Power Producers:
*Steve Gabel, Gabel Associates for Independent Energy Producers of New Jersey

Hospital Waste Incinerators
Chris LaBianco, NJ Hospital Association

Refineries/Refinery Products:
*Robert A. Morris, The Coastal Corporation (resigned)

Sewage Sludge Incinerators
Robert Dixon, Gloucester County Utilities Authority

Hazardous Waste Incinerators:
*****Keith Michels, Safety-Kleen (Bridgeport), Inc.

Freshwater Fishing Organization:
*****Tom Fote, NJ Sportsmens Federation/Jersey Coast Anglers Association

Saltwater Commercial Fishing Organization: Captain Nelson Beideman, Blue Water Fisherman's Association

*****Michael Gochfeld, MD, Ph.D., EOHSI/UMDNJ,
Task Force Chairman

Henry Cole, Ph.D., Henry S. Cole & Associates, Inc.
(resigned)

*****Robert Tucker, Ph.D., Stony Brook-Millstone Watershed Association

•Participating members within the past year.

*Valerie Thomas, Ph.D., Center for Energy and Environmental Studies, Princeton University

William Potter,
Potter & Dixon

Official Replacements

Jasmine Vasvada, NJPIRG

Susan Goodwin, Alicia Culver, *Janet Cox, INFORM

*Betty Jensen, PSEG (resigned)

Other Active Participants

William Baker, EPA Region 2, Air

Andy Bellina, EPA Region 2, RCRA

Eric Vowinkel, USGS

Jerry Marcus, Two Bridges Sewerage Authority

Priscilla Hayes, Rutgers University, NJ Solid Waste Policy Group

Russ Like, Gabel Associates

Mercury Task Force
NJDEP Participants

Division of Science, Research and Technology
Mike Aucott, Co-chair Sources Subcommittee
Alan Stern, Co-chair Impacts Subcommittee
Gary Buchanan
Mary Downes-Gastrich
Randy England
Eileen Murphy
Bruce Ruppel
Sue Shannon
Mike Winka

Air Quality Permitting
Sunila Agrawal
Joann Held
William O'Sullivan

Pollution Prevention
Mike McLinden

Division of Water Quality
Tony Pilawski

Site Remediation Program
Jim DeNoble

Division of Solid & Hazardous Waste
Tim Bartle
John Castner
Bob Confer
Ken Frank
Tom Sherman

Key Findings on Impacts

Dr. Michael Gochfeld, Task Force Chair

IMPACTS SUBCOMMITTEE

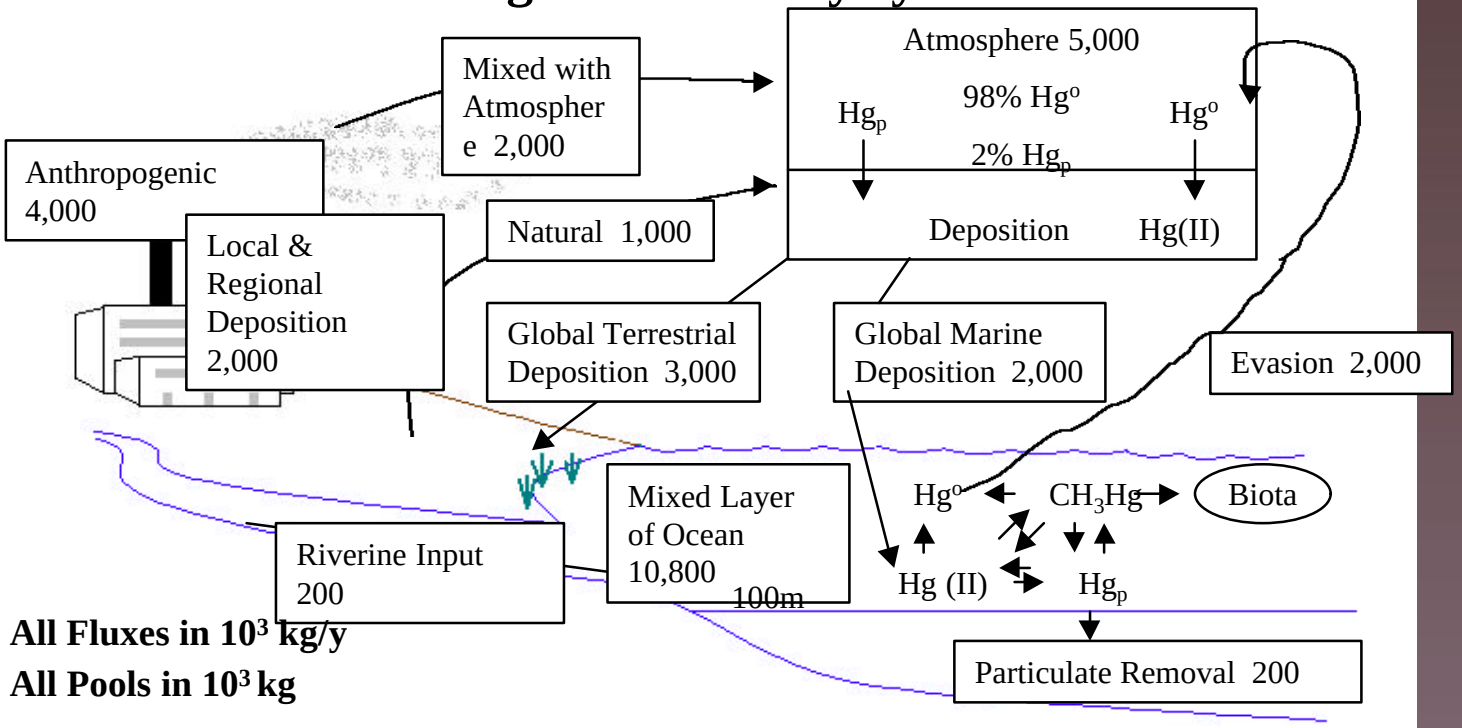
- Environmental media (air, water, soil)
- Wildlife and ecosystems
- Human exposure and health
- Recreational and economic

- Concentrations vs. impacts

EXPOSURE PATHWAYS

- DIRECT EXPOSURE
  - Occupational
  - Residential
- INDIRECT EXPOSURE
  - Food chain (fish)

The current global mercury cycle



All Fluxes in 10^3 kg/y

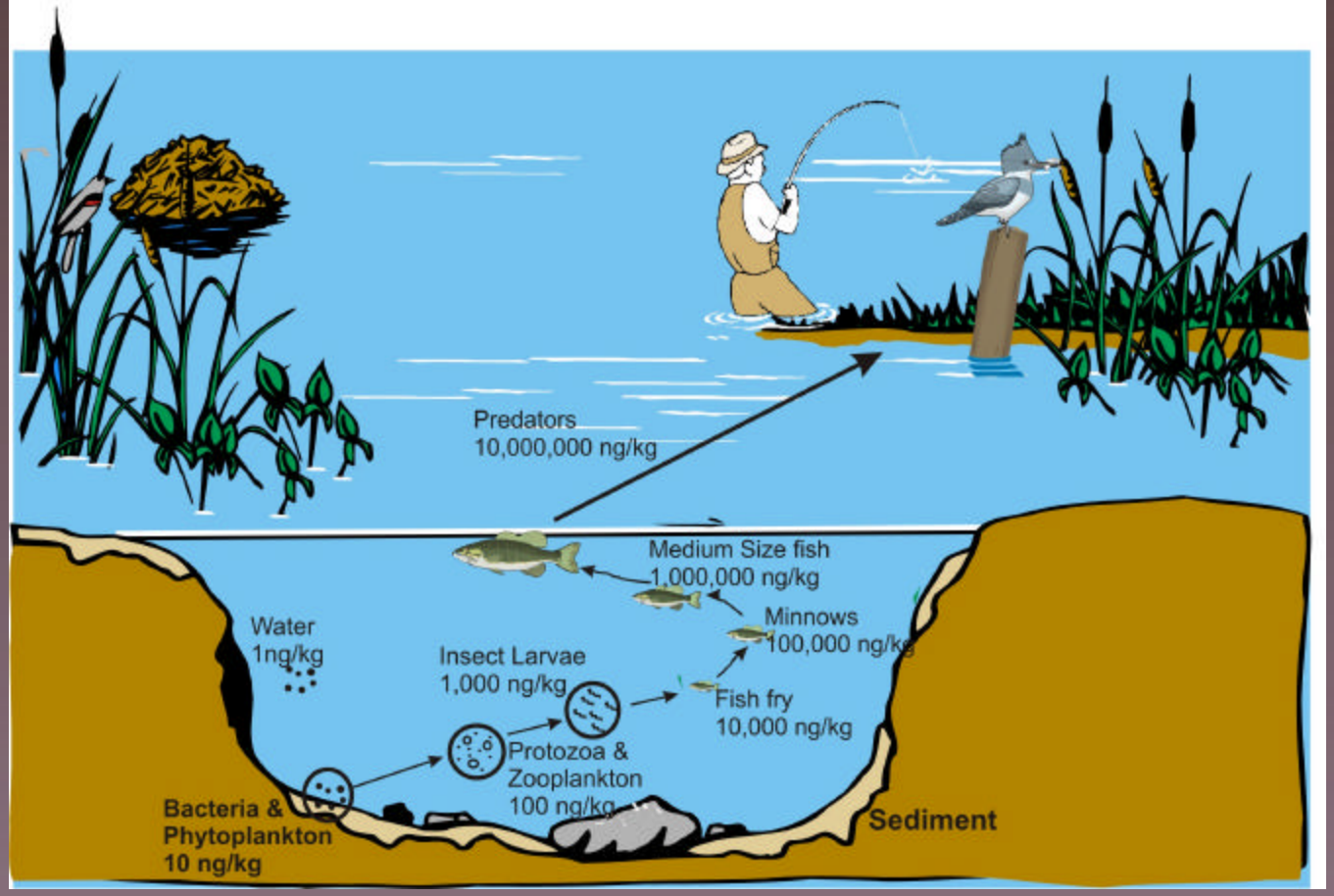
All Pools in 10^3 kg

Hg_p = mercury associated with particles
Hg^o = elemental mercury
Hg(II) = oxidized mercury
CH_3Hg = methylmercury
kg = kilograms
kg/y = kilograms per year

Adapted from: Mason, R.P., W.F. Fitzgerald, & F.M.M. Morel, 1994, The biogeochemical cycling of elemental mercury: Anthropogenic influences, *Geochimica et Cosmochimica Acta*., Vol. 58, pp. 3191-3198.

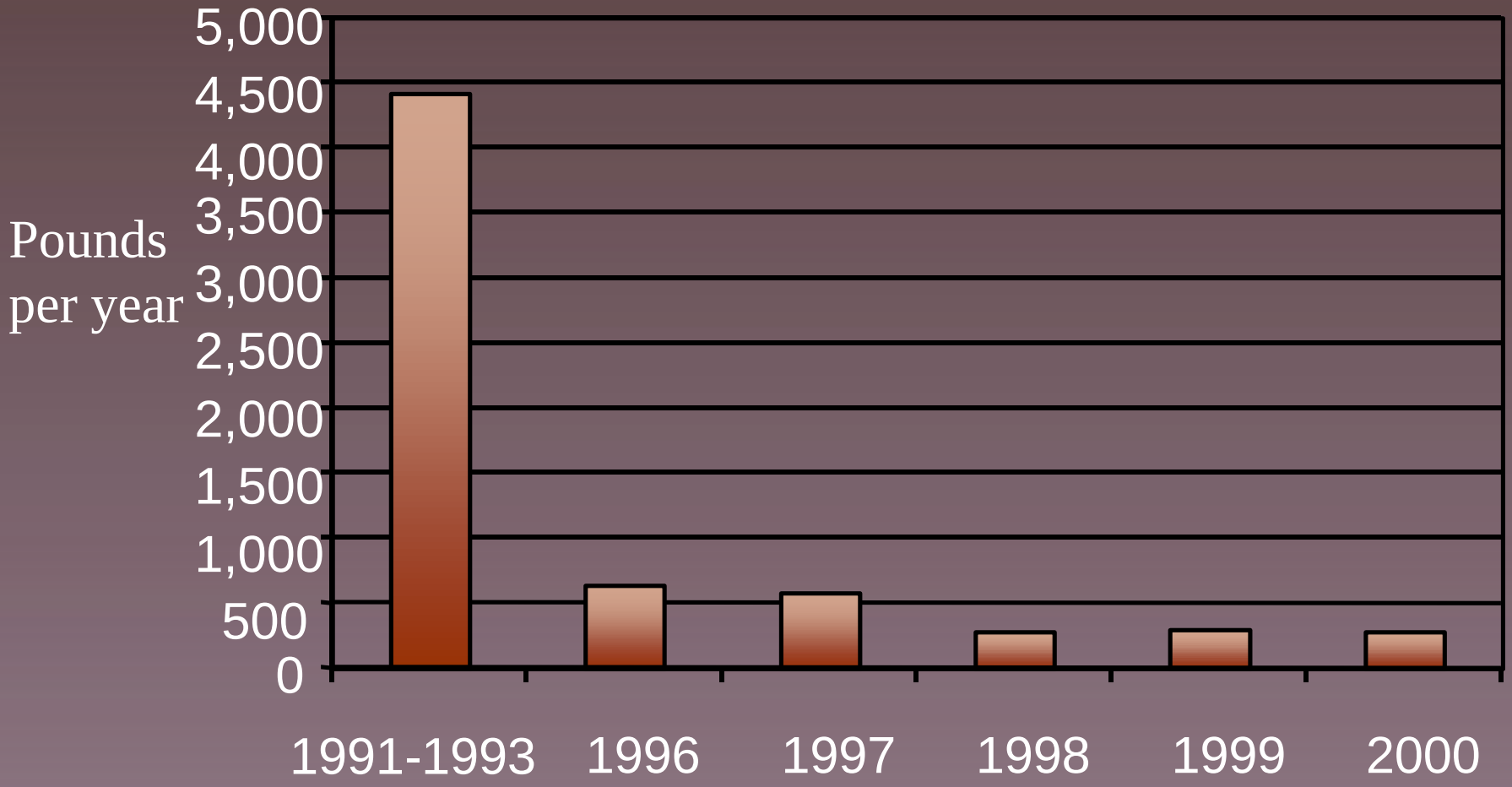
Typical Pattern of Biomagnification

(showing rough estimates of mercury concentrations in organisms at various stages of the process)

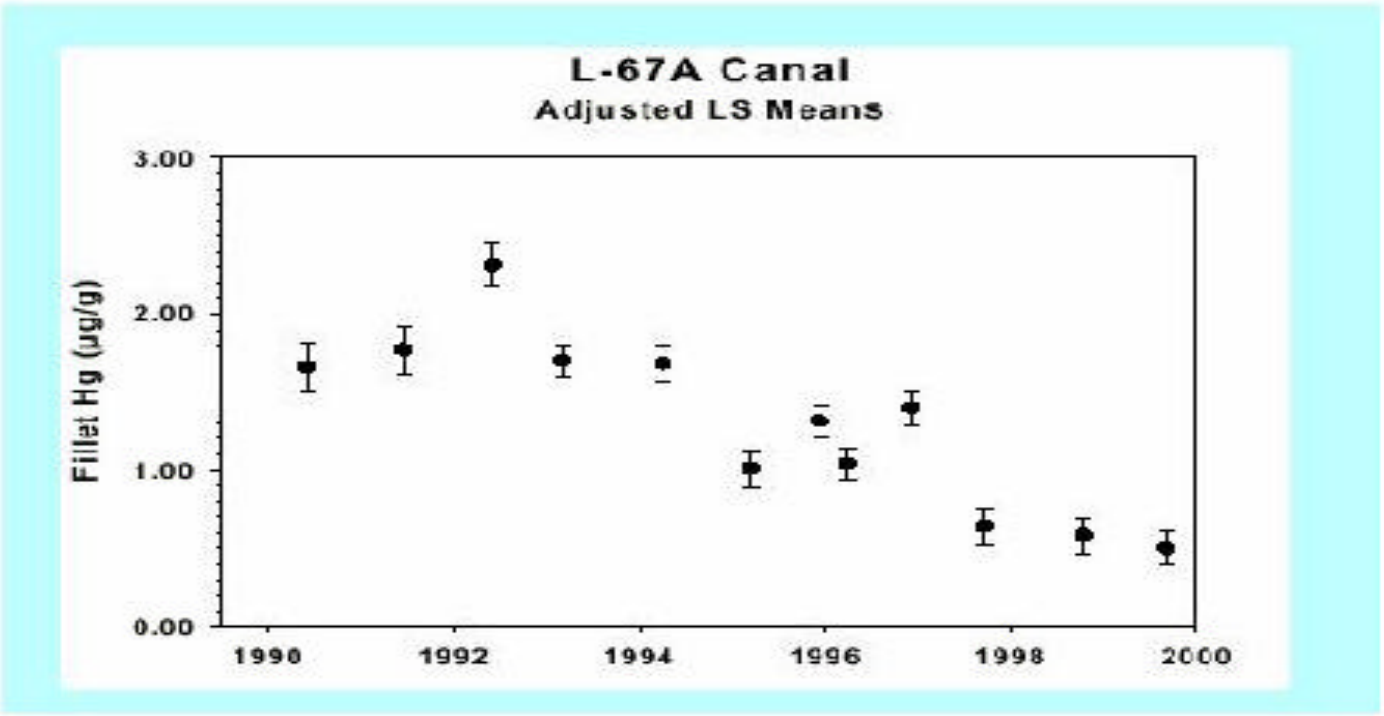


Note: Relative concentrations are conceptual; it is likely that the initial accumulation rates, e.g. water to bacteria and phytoplankton, are considerably large than a factor of 10, and later stages are smaller than a factor of 10.

Annual Mercury Emissions from NJ Municipal Solid Waste Incinerators



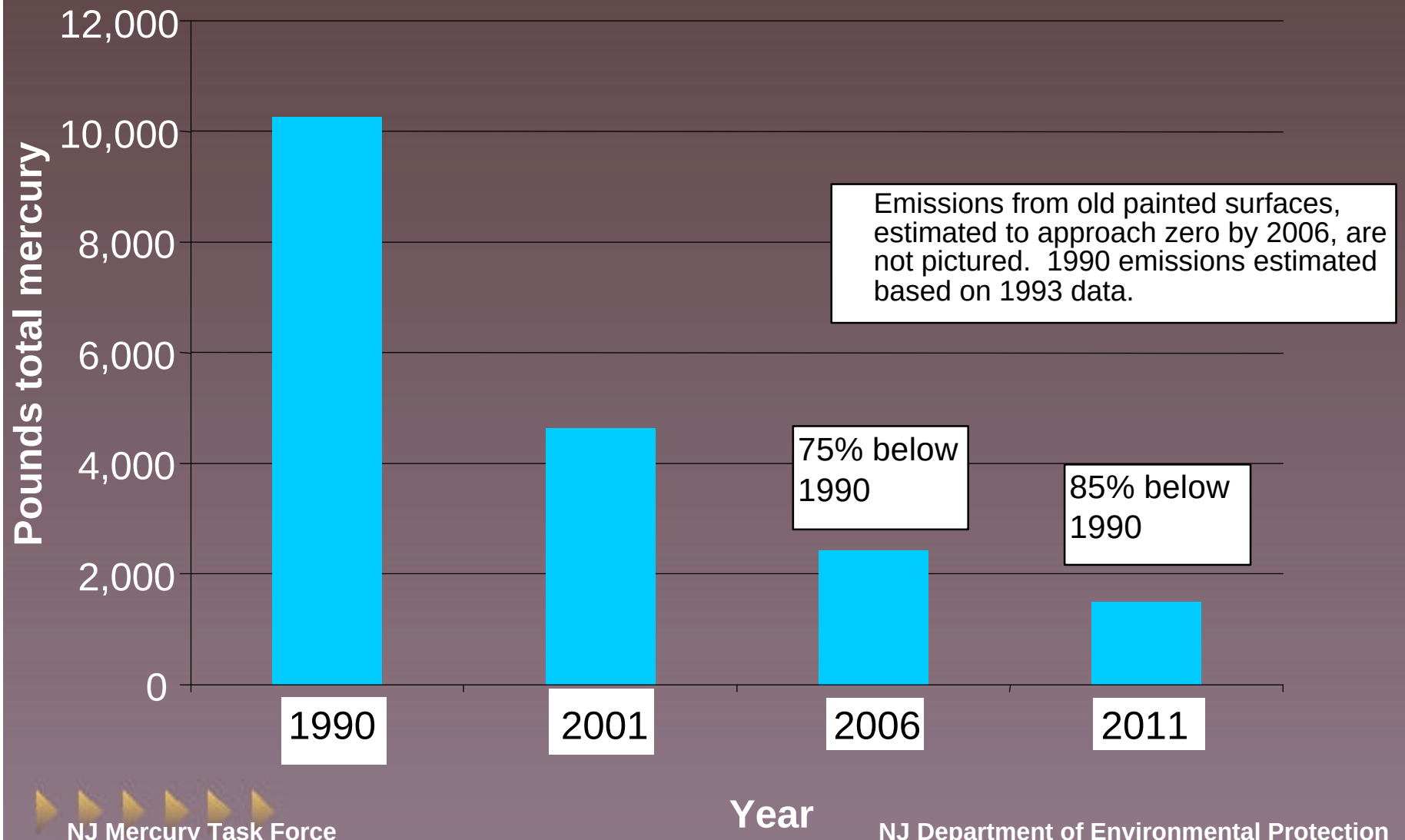
Changes in Mercury Concentration in Tissue of Largemouth Bass in a Florida Everglades Location in Conjunction with Reductions of Emissions of Mercury from Local Sources



Mercury in fillets of age-standardized largemouth bass in Everglades Canal L-67 (Lange et al., 2000). Adjusted least square means.

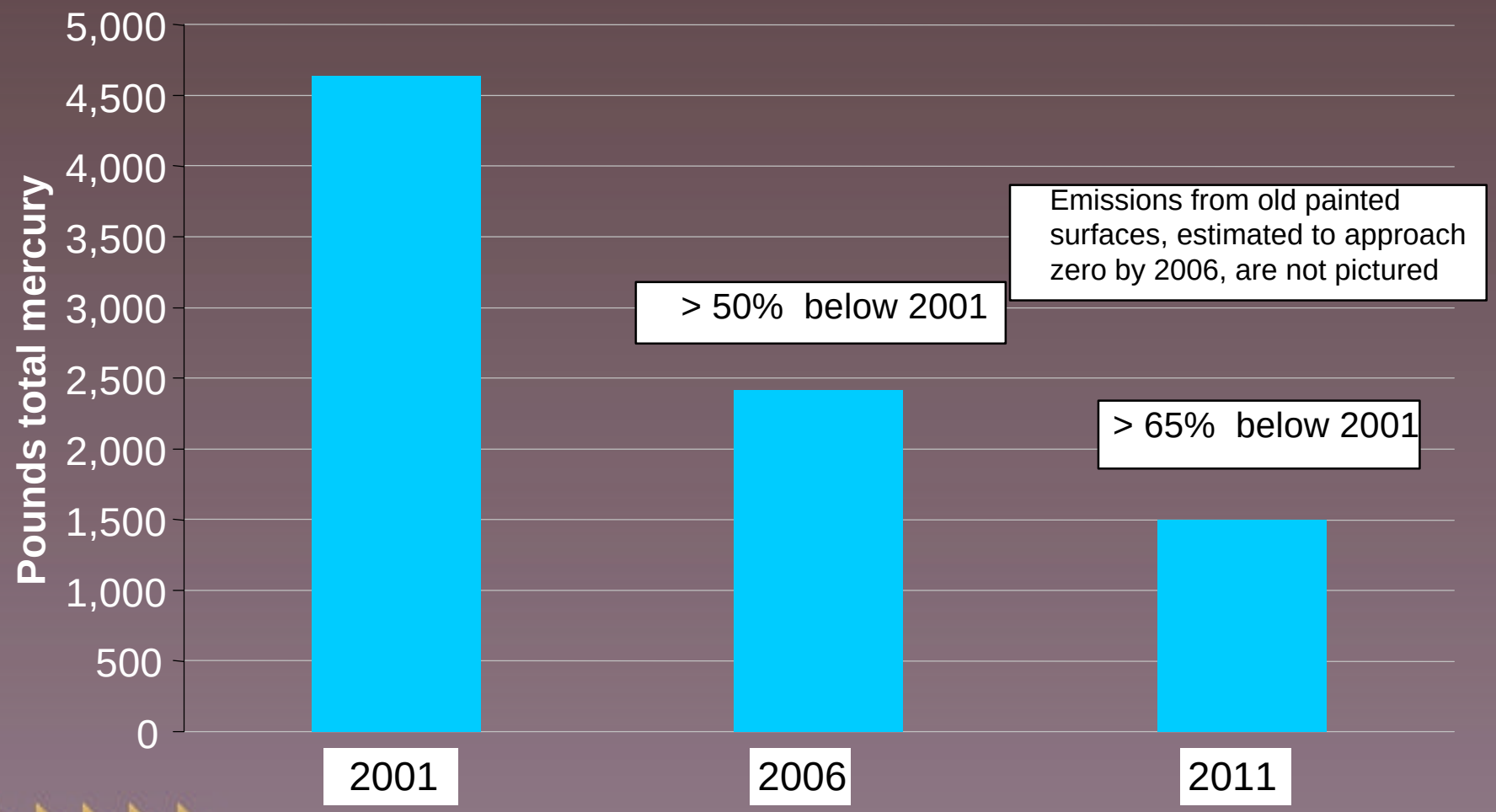
Mercury Air Emissions Goals in NJ:

Projected overall reduction of 75% from 1990 to 2006 and 85% from 1990 to 2011

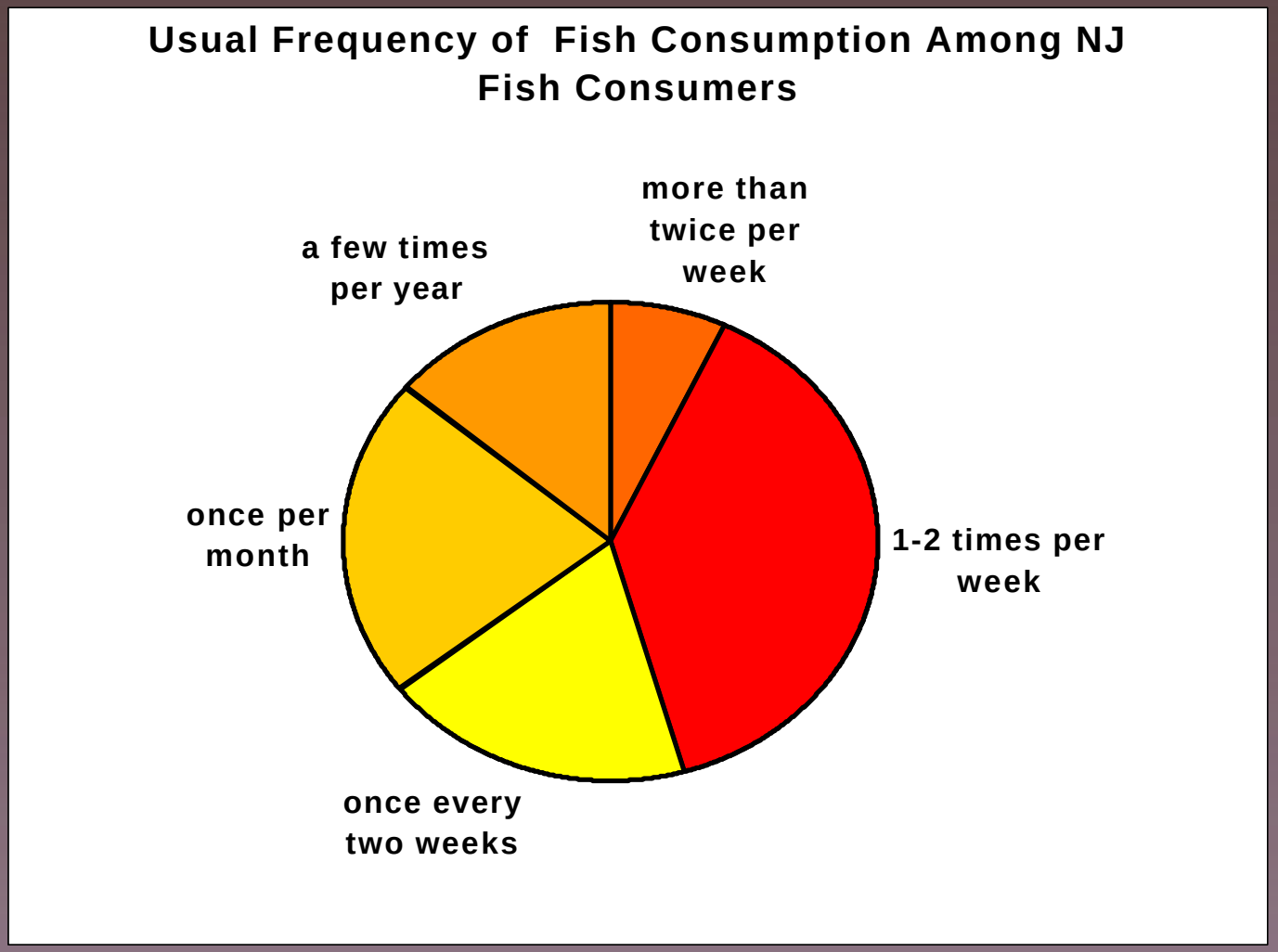


Mercury Air Emissions Goals in NJ:

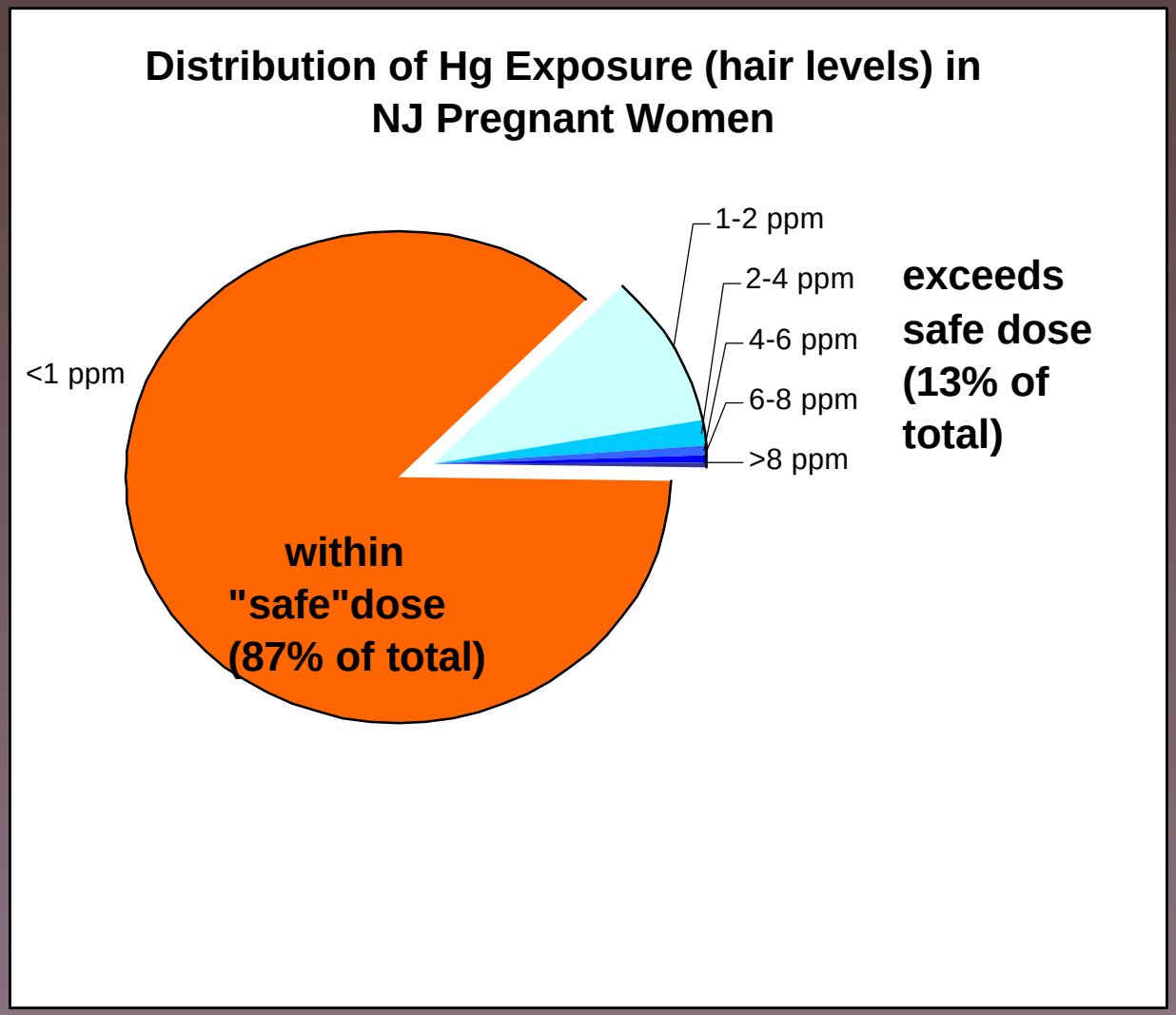
Projected overall reduction greater than 50% from 2001 to 2006 and greater than 65% from 2001 to 2011



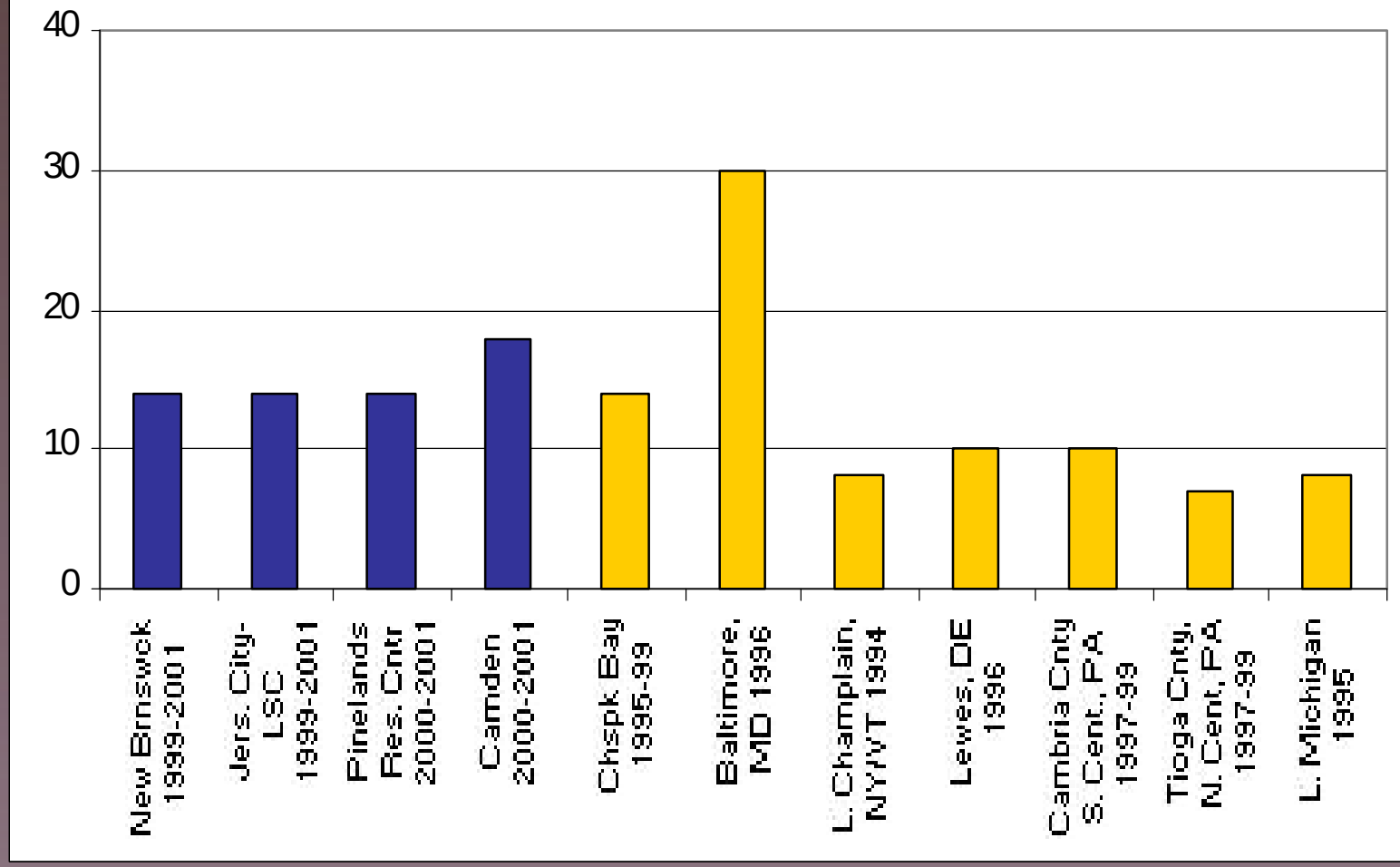
Reported Usual Consumption of Fish Among 1,000 New Jersey Survey Respondents Who Reported At Least Some Fish Consumption in 1995.



Distribution of Total Hg in Hair from the Sample of NJ Pregnant Women

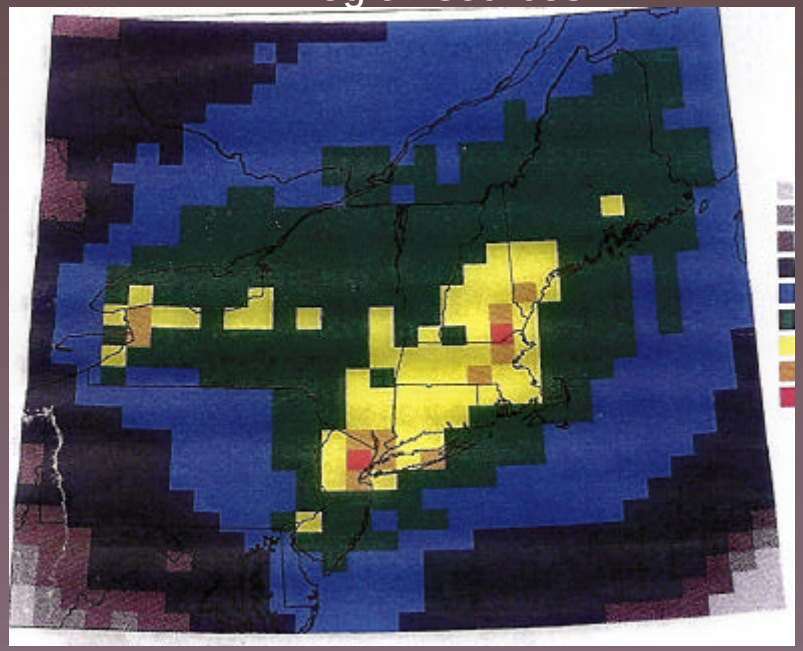


Mercury Wet Deposition in NJ and Nationally (ug/m^2/year)



Estimated Total Mercury Deposition in the Northeast from In-Region Sources and from ALL U.S. Sources

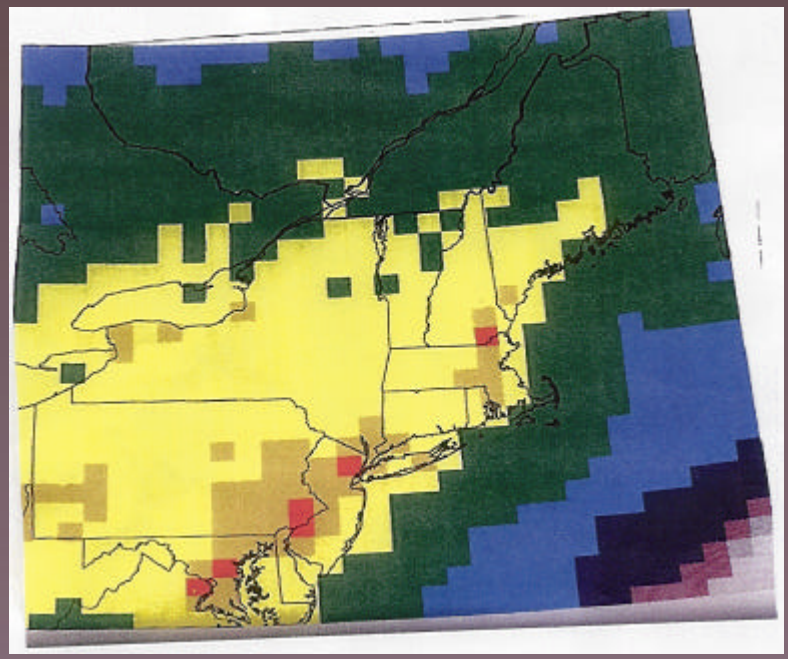
deposition from
In-region sources



$\mu g/m^2$

<0.03
0.03-0.1
0.1-0.3
0.3-1
1-3
3-10
10-30
30-100
>=100

Hg deposition from all
U.S. sources



(Source: NESCAUM et.al. Northeast States and Eastern Canadian Premiers Mercury Study- A Framework for Action. February 1998)

Key Findings on Sources

Bill Baker, USEPA

March 1998 Charges to the Task Force Particularly Applicable to the Sources Subcommittee

2. Inventory and assess current sources of mercury pollution ...

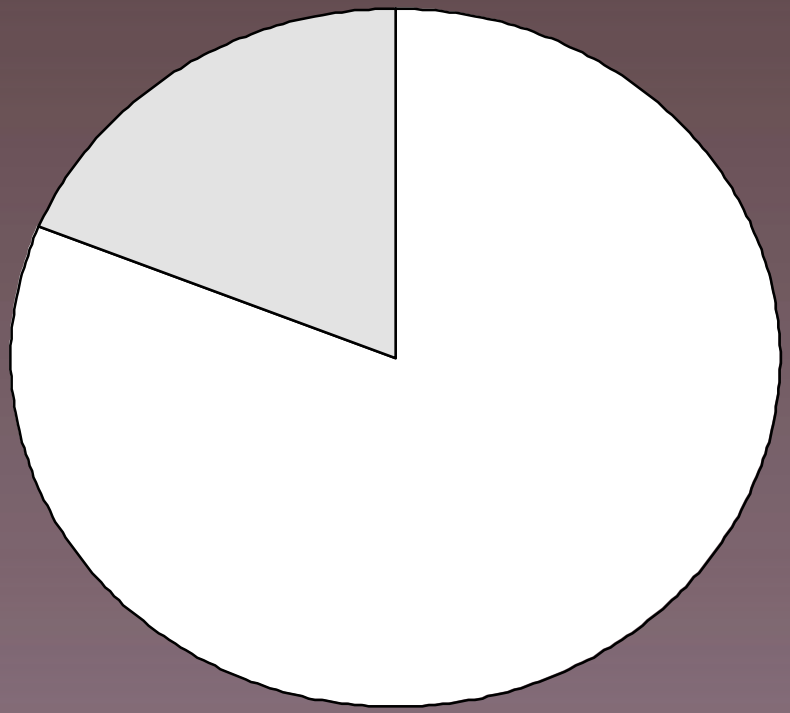
5. Develop a mercury pollution reduction plan …

   A. Recommend mercury emission controls and standards for in-state sources ...

Releases of mercury can be categorized in a variety of ways

- By the medium to which the release occurs:
  - air, water or land
- By type of emissions source:
  - industrial, commercial, residential, transportation, agriculture, government or electricity generation
- By the origin of the mercury:
  - deliberately added to a product or incidental contaminant

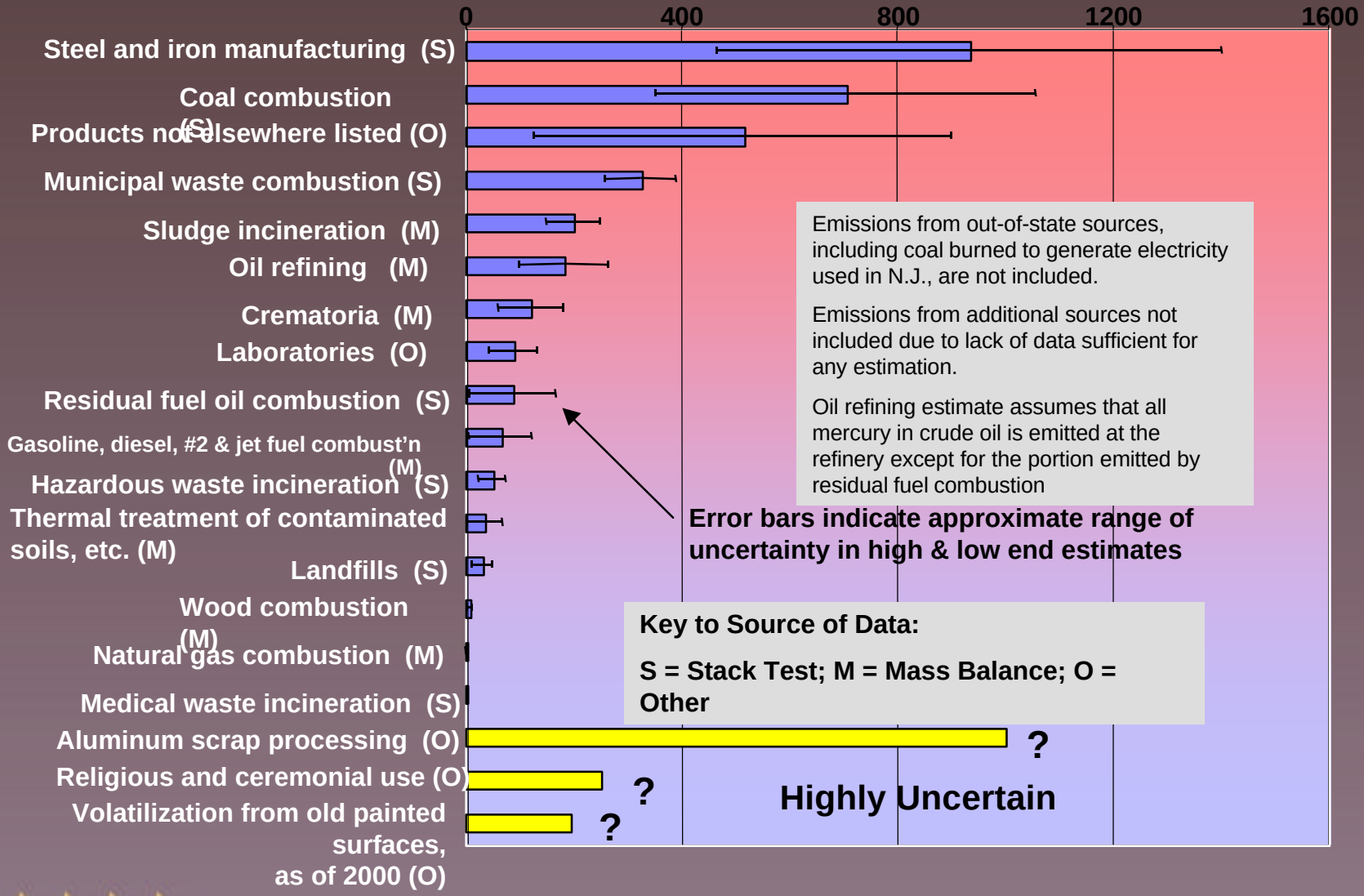
Releases to Air, Water, & Land; by Origin of Mercury



- Intentionally added to products
- Incidental contaminant, e.g., fuels

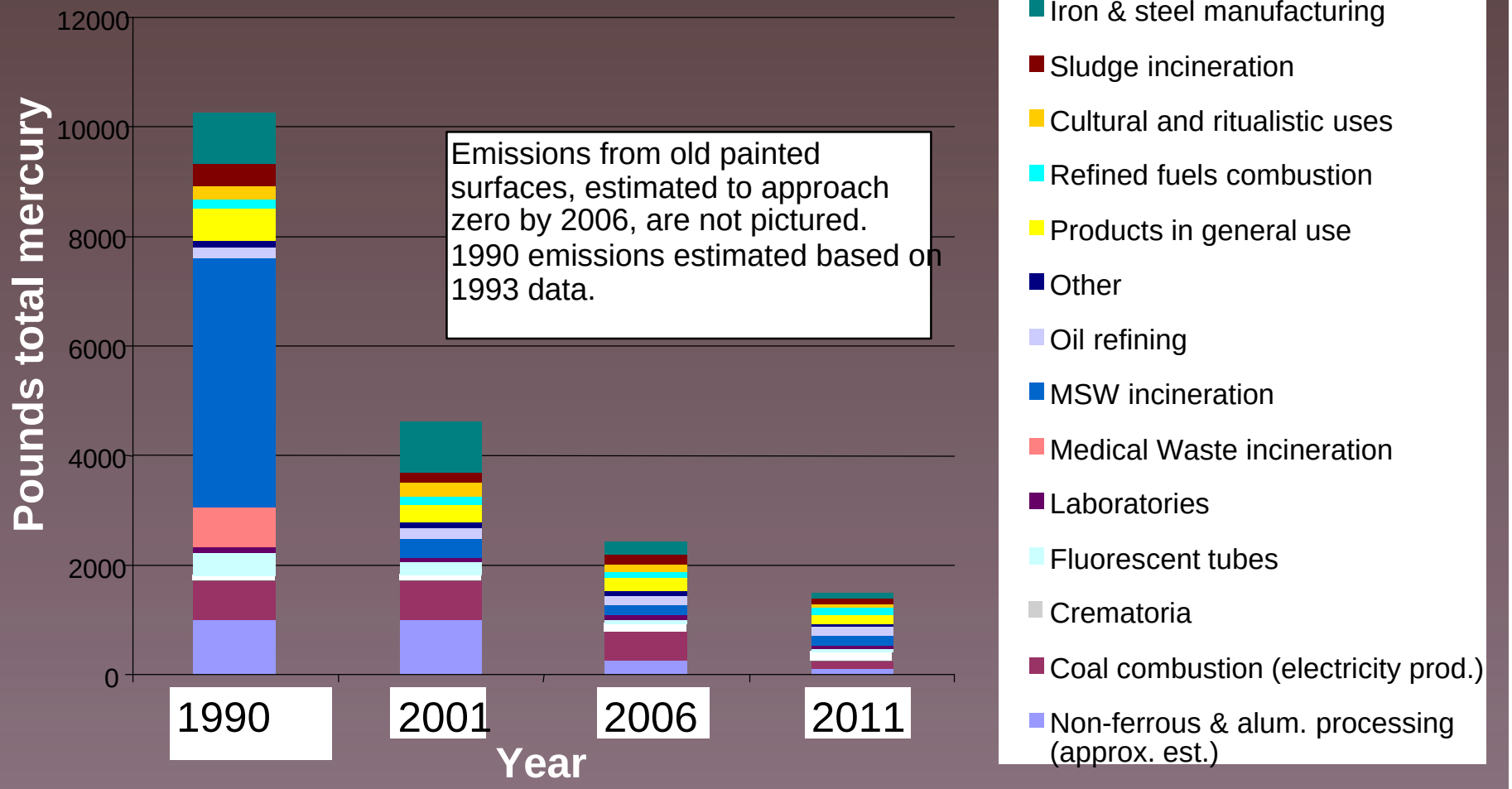
Estimated Mercury Emissions to the Air in New Jersey From New Jersey Sources (pounds/year)

Based on the most recent source-specific data from the late 90's to 2001

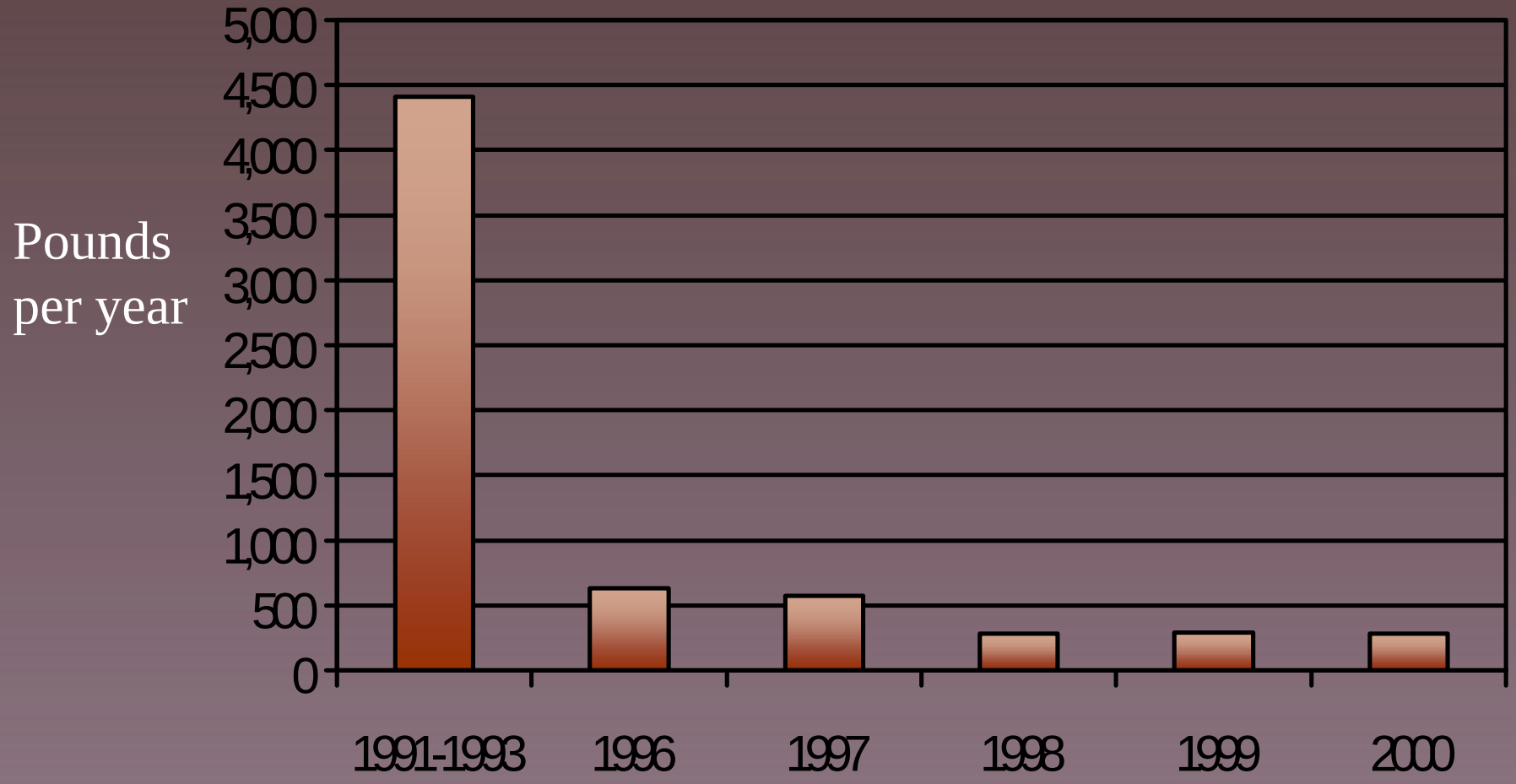


Mercury Air Emissions Goals in NJ:

Projected overall reduction of 75% from 1990 to 2006 and 85% from 1990 to 2011



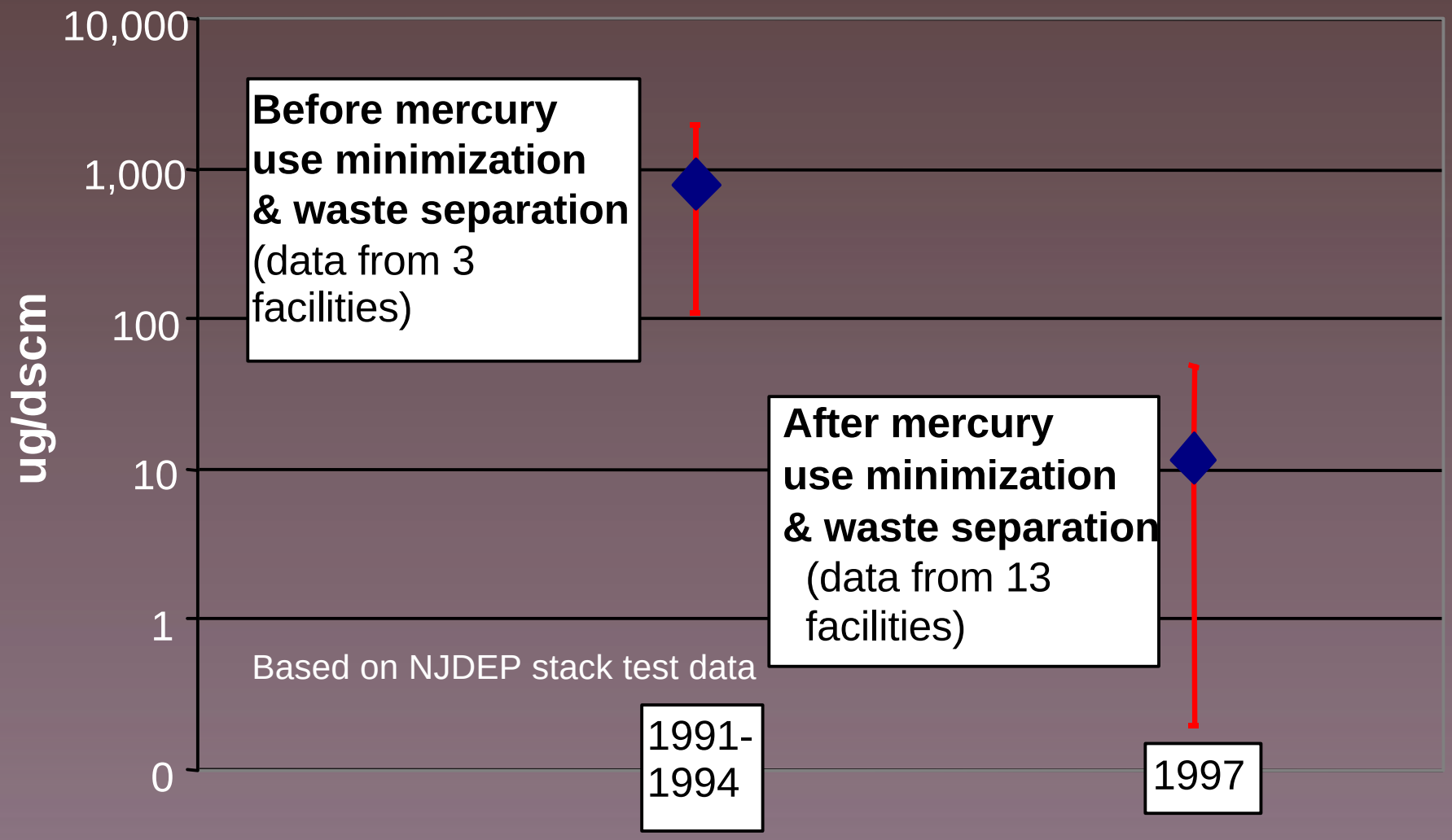
Annual Mercury Emissions from NJ Municipal Solid Waste Incinerators



NJ Medical Waste Incinerator Emissions

Stack gas concentrations: mean & range

(Note: concentrations shown on log scale due to large range)



Sources Subcommittee Recommendations Developed Using the Following Process:

- Identify, describe, and quantify releases from each source category
- Identify reduction options for each
- Estimate feasibility of achieving each option
- Estimate importance of achieving each option
- Prioritize options by feasibility and importance
- Consolidate prioritized options into final list of Key Recommendations
- Full Task Force review and finalize

KEY RECOMMENDATIONS

A. Participate in and support regional, national and global efforts to reduce mercury uses, releases and exposures

For Example:

- **The Conference of the New England Governors' and Eastern Canadian Premiers (NEGA/ECP)**
- **Environmental Council of States (ECOS)**
- **U.S. Environmental Protection Agency Mercury Action Plan**

KEY RECOMMENDATIONS
(continued)

B. Remove mercury from products and phase out sales of mercury-containing products for which there are reasonably available alternatives

In order to accomplish this six specific actions are recommended

KEY RECOMMENDATIONS
(continued)

C. Reduce emissions of mercury from the production of electricity consumed in New Jersey

- Promote energy efficiency
- Promote the use of power from certified green sources
- Require the disclosure of mercury emissions per kilowatt-hour from electricity sellers in N.J.

KEY RECOMMENDATIONS
(continued)

D. Significantly reduce air emissions from coal combustion

- Urge EPA to stringently limit mercury emissions from coal combustion
- Adopt State standards if EPA do not act by 12/03
- Work with interstate organizations to assist in the development of federal multi-pollutant legislation

KEY RECOMMENDATIONS
(continued)

E. Significantly reduce air emissions from iron and steel and other secondary smelting industries

- Urge the rapid phase out of mercury-containing products in new vehicles
- Implement a strategy developed through a cooperative process for the phased reduction of mercury contaminated scrap
- Investigate secondary aluminum smelting as a mercury source and regulate if significant

KEY RECOMMENDATIONS
(continued)

F. Ensure the minimization of mercury emissions from other sources

1. Medical Waste Incinerators

- Adopt NEGA/ECP recommended emission limit

KEY RECOMMENDATIONS
(continued)

F. Ensure the minimization of mercury emissions from other sources

2. Sewage Sludge Incinerators

- Revise State rule to require a phased reduction over 10 years to a 2 ppm emission standard

KEY RECOMMENDATIONS
(continued)

F. Ensure the minimization of mercury emissions from other sources

3. Municipal Solid Waste Incinerators

- **Consider revising the State's municipal solid waste incinerator rule to include a more restrictive post-combustion efficiency requirement**

KEY RECOMMENDATIONS
(continued)

F. Ensure the minimization of mercury emissions from other sources

4. Other

- Develop methods to appropriately regulate and otherwise manage the disposal of mercury-containing products

KEY RECOMMENDATIONS
(continued)

G. Expand and institutionalize routine monitoring for mercury in fish from New Jersey waters through State-level programs.

KEY RECOMMENDATIONS
(continued)

H. Actively encourage the federal government to initiate and maintain comprehensive monitoring and surveillance for mercury in commercial fish and to require that information regarding the mercury content of fish be made readily available. If the federal government does not initiate nation-wide evaluation of commercial fish, New Jersey should, with other states in the region, monitor mercury in commercial fish.

KEY RECOMMENDATIONS
(continued)

I. Expand and periodically evaluate the effectiveness of current outreach, advisories and education efforts to reduce exposures to mercury of sensitive populations, subsistence fishermen, and others who consume large quantities of fish. To accomplish this, New Jersey should:

1. Increase public awareness of the public health concerns regarding mercury in fish and the need to reduce the emissions and releases to the State's waterbodies.

KEY RECOMMENDATIONS
(continued)

I. Expand and periodically evaluate the effectiveness of current outreach, advisories and education efforts to reduce exposures to mercury of sensitive populations, subsistence fishermen, and others who consume large quantities of fish. To accomplish this, New Jersey should:

2. Expand outreach on fish advisories, particularly for sensitive populations, subsistence fishers, and others who consume large quantities of fish.

KEY RECOMMENDATIONS
(continued)

J. Reduce exposures from cultural uses of mercury. To accomplish this, New Jersey should:

1. Complete research and evaluate available data on cultural uses and associated exposures.

KEY RECOMMENDATIONS
(continued)

J. Reduce exposures from cultural uses of mercury. To accomplish this, New Jersey should:

2. Provide outreach and education materials to communities and health professionals.

KEY RECOMMENDATIONS
(continued)

J. Reduce exposures from cultural uses of mercury. To accomplish this, New Jersey should:

3. Develop and implement appropriate legislation and regulations that limit the sale of elemental mercury, except for medical and other approved uses, reflecting the NEWMOA model legislation.

KEY RECOMMENDATIONS
(continued)

K. Develop comprehensive mercury budgets for New Jersey watersheds that include inputs from air deposition, in order to develop appropriate total maximum daily loads (TMDLs). To do this, New Jersey should:

1. Utilize the most recent information developed through the U.S. EPA's pilot mercury TMDL development projects.

KEY RECOMMENDATIONS
(continued)

K. Develop comprehensive mercury budgets for New Jersey watersheds that include inputs from air deposition, in order to develop appropriate total maximum daily loads (TMDLs). To do this, New Jersey should:

2. Determine the relative mercury contribution to aquatic systems from various sources and from repositories in environmental media.

KEY RECOMMENDATIONS
(continued)

L. Maintain and enhance a long-term air deposition monitoring system that incorporates state-of-the-art detection limits and speciation to document temporal and spatial trends in mercury deposition.

KEY RECOMMENDATIONS
(continued)

M. Address critical information gaps concerning the quantities and chemical species of mercury emissions and releases, the fate and transport of mercury in the environment, and the exposure pathways. To accomplish this, New Jersey should:

1. Upgrade procedures used in all monitoring programs to include state-of-the-art analytical methods to provide lower detection limits for mercury and mercury speciation.

KEY RECOMMENDATIONS
(continued)

M. Address critical information gaps concerning the quantities and chemical species of mercury emissions and releases, the fate and transport of mercury in the environment, and the exposure pathways. To accomplish this, New Jersey should:

2. Employ a state-level, long-range dispersion model for mercury using the up-to-date emissions inventories including the inventory developed by the Mercury Task Force.

KEY RECOMMENDATIONS
(continued)

M. Address critical information gaps concerning the quantities and chemical species of mercury emissions and releases, the fate and transport of mercury in the environment, and the exposure pathways. To accomplish this, New Jersey should:

3. Encourage federal agencies to expand existing national research on the ecological effects of mercury, particularly on piscivorous (fish-eating) fish, birds and mammals (particularly marine mammals).

KEY RECOMMENDATIONS
(continued)

M. Address critical information gaps concerning the quantities and chemical species of mercury emissions and releases, the fate and transport of mercury in the environment, and the exposure pathways. To accomplish this, New Jersey should:

4. Identify demographic characteristics and exposure patterns of population groups in New Jersey that consume large quantities of fish.

KEY RECOMMENDATIONS
(continued)

M. Address critical information gaps concerning the quantities and chemical species of mercury emissions and releases, the fate and transport of mercury in the environment, and the exposure pathways. To accomplish this, New Jersey should:

5. Consider establishing the mercury-contaminated sites in the Berry's Creek area as an Environmental Research Park, patterned on the National Environmental Research Park system. This could serve as a resource for studies and monitoring of the complex processes governing the fate and transport of mercury in both the terrestrial and estuarine environment.

KEY RECOMMENDATIONS
(continued)

N. Support the development of effective methods of retiring and sequestering mercury so that the chances of the eventual release of mercury to the environment are minimized.

KEY RECOMMENDATIONS
(continued)

O. Develop improved environmental indicators of the impact of mercury on New Jersey's environment. To accomplish this, New Jersey should:

1. Expand and maintain a statewide ground water monitoring program for mercury.

KEY RECOMMENDATIONS
(continued)

O. Develop improved environmental indicators of the impact of mercury on New Jersey's environment. To accomplish this, New Jersey should:

2. Develop and apply indicators of trends of mercury in environmental media, including air deposition, mercury concentrations in surface water, mercury entry into aquatic food chains, mercury levels in fish tissue, mercury levels in human tissue in the New Jersey population, and mercury levels in feathers of piscivorous birds nesting in New Jersey.

KEY RECOMMENDATIONS
(continued)

P. To provide for the implementation of the recommendations in this report, New Jersey should:

1.Form within the New Jersey government, a multi-agency committee, including the Department of Environmental Protection, Department of Health and Senior Services, Department of Transportation and the Board of Public Utilities, to advocate the implementation of the recommendations and to report periodically to the Legislature and the Commissioner of the NJDEP on progress toward achieving the mercury milestones.

KEY RECOMMENDATIONS
(continued)

P. To provide for the implementation of the recommendations in this report, New Jersey should:

2. Establish the position of an environmental mercury coordinator in the NJDEP as has been done in other states.

KEY RECOMMENDATIONS
(continued)

Q. Reduce mercury levels in fish and other biota. Mercury concentrations in freshwater and estuarine fish in New Jersey should, at a minimum, be in compliance with the EPA's recent Surface Water Criterion of 0.3 µg/g methylmercury in tissue.

Mercury Switch Recovery Partnership Program

Builds on two of the key recommendations for Iron and Steel manufacturing, as summarized below:

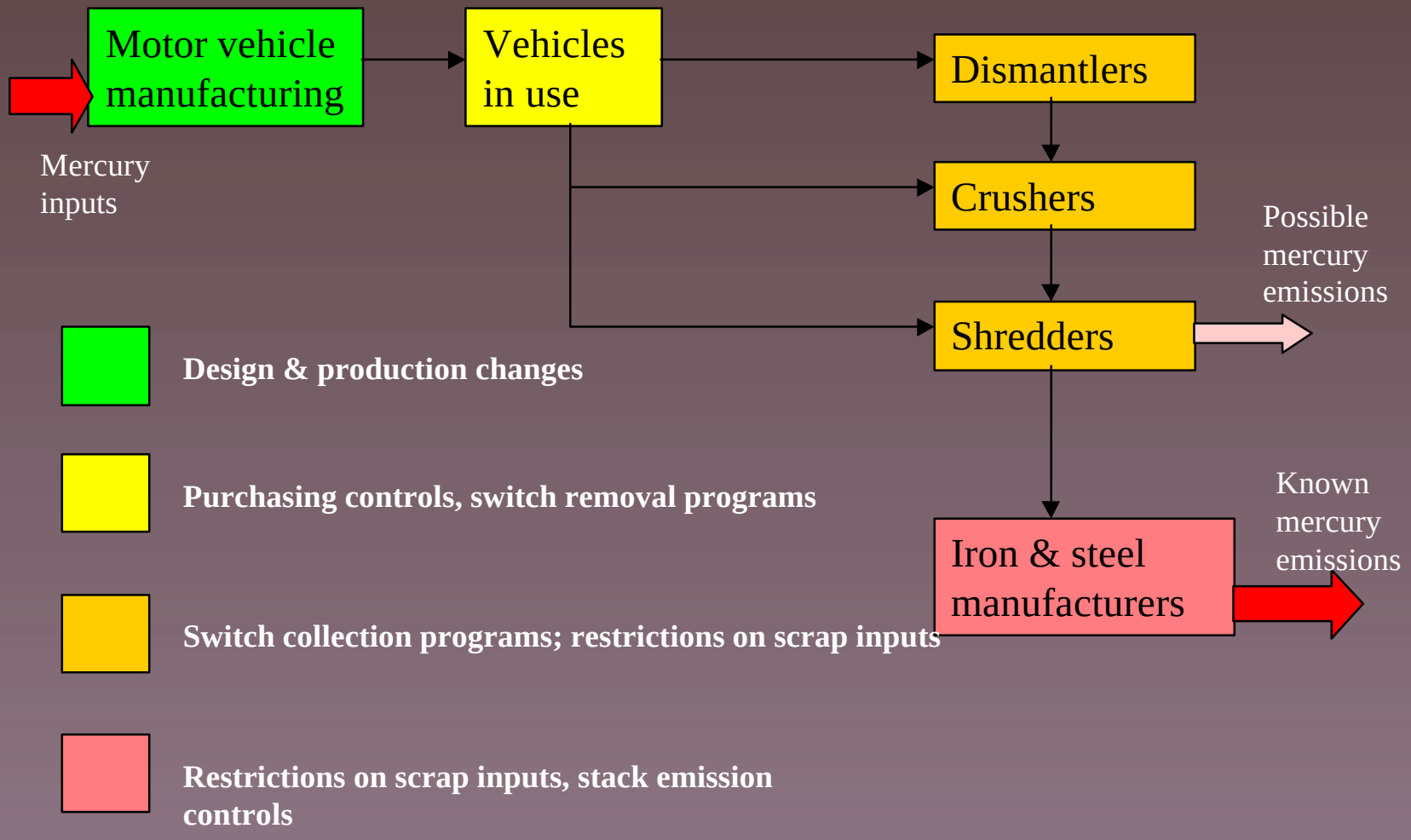
- Implement a phased strategy to reduce mercury contamination of scrap. If, after a 3-year period, the source reduction measures do not achieve emission reduction goals, require air pollution control.

- Ensure that measures to reduce mercury contamination of scrap are developed through a cooperative process involving government agencies and affected industries.

PERFORMANCE PARTNERSHIP AGREEMENT
Mercury Switch Recovery Incentive Program

- **Partners – USEPA, NJARA, NJISRA, ANJHHWC, NJF, Comus Intl.**
- **Agreement – To establish an interim mercury switch recovery program**
- **Performance – To reduce mercury emissions to the environment from iron and steel recycling**

Mercury from the Recycled Metals Stream; Pollution Prevention and Control Strategies



Sustainable Product Awards for Low or Mercury Free Products

Comus International
Bob Romano, President

Honeywell
Paul Boudreau, Vice President
Corporate Relations

Panasonic
David Thompson, General Manager
Corporate Environmental Department

Philips Lighting
Paul Walitsky, Manager Environmental Affairs

Ford Motor Company
Sue Cischke, Vice President
Environmental Safety Engineering