



**TAKING THE
MERCURY
INITIATIVE**

September 13, 2004; 1–3 p.m.

Oliver Pollock Room

Galvez Building • 602 N. Fifth Street • Baton Rouge, LA 70802

File information updated 2026

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY SEMINAR TO DISCUSS MERCURY IN LOUISIANA

- 1. WELCOME: DR. MIKE MCDANIEL, SECRETARY**
What mercury is, how it gets in the environment and why it is a nationwide problem
- 2. HISTORY: ALBERT HINDRICHS**
History and progress of DEQ's Mercury Program
- 3. AIR: JIM ORGERON**
Mercury in air emissions: Industrial sources
- 4. WATER: CHRIS PIEHLER**
Contributions from waste water and methylation; impacts
- 5. CONSUMER PRODUCTS AND RECYCLING: JOHN ROGERS**
Thermostats, thermometers and recycling aspects of mercury products
- 6. LAND: BILL SCHRAMM**
Manometers and remediation
- 7. QUESTION & ANSWER SESSION – SPEAKER PANEL**
- 8. SIGN UP FOR DISCUSSION GROUPS**



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**Louisiana Department
of Environmental Quality**

Mercury in the Environment

Defining the Problem

Mike D. McDaniel, Ph.D.

2004 LDEQ Secretary



What is Mercury?

Physical/Chemical Properties:

- Mercury is a silver-white, heavy, mobile, liquid metal. Solid mercury is tin-white.
- Melting point is -38.9 C; boiling point is 356.7 C.
- Specific gravity (density) is 13.5 at 25 C.
- Slightly soluble in water (0.06g/l of water at 25 C).
- Vapor pressure = 2×10^{-3} mm Hg at 25 C; volatilization from water and soil is significant.
- Synonyms: liquid silver, quicksilver, hydragyrum, colloidal mercury.
- Mercury can exist in several forms (elemental, inorganic compounds, organic compounds).
- It is an extremely useful compound as it conducts electricity, can be used to measure temperature and pressure, and easily forms alloys with other metals.



Mercury in the Environment

Natural Sources:

- Globally, about 2220 metric tons of mercury are emitted each year, of which $\sim 1/4 - 1/3$ comes from natural processes like volcanic eruptions and undersea vents.
- Mercury is a trace component of many minerals. The important commercial ore is cinnabar, but mercury is also found in limestone, calcareous shales, sandstone, serpentine, chert andesite, and others.
- In industry, mining, coal burning, metal production, and cement make up the top sources of emissions (about 1850 total metric tons; 2018).



Mercury in the Environment

Man-Made Sources:

- 2014-2023 Releases of mercury to air: 49 thousand pound decrease (-63%), largely driven by decreased stack emissions
- Mercury was used extensively in agricultural applications of pesticides and fungicides; modern regulated pesticides generally do not contain mercury. However, mercury does not degrade over time.
- Phenyl mercuric compounds were used extensively as slimicides in paper mills.
- Mercury containing manometers were used extensively at gas line metering stations (25,000 – 30,000) throughout the state; these (as well as dairy manometers) were banned for sale or use in Louisiana by 2007.

Sources: USEPA 2025; J. Gilkeson 1996, LDEQ 2012



Mercury in the Environment

Man-Made Sources Continued:

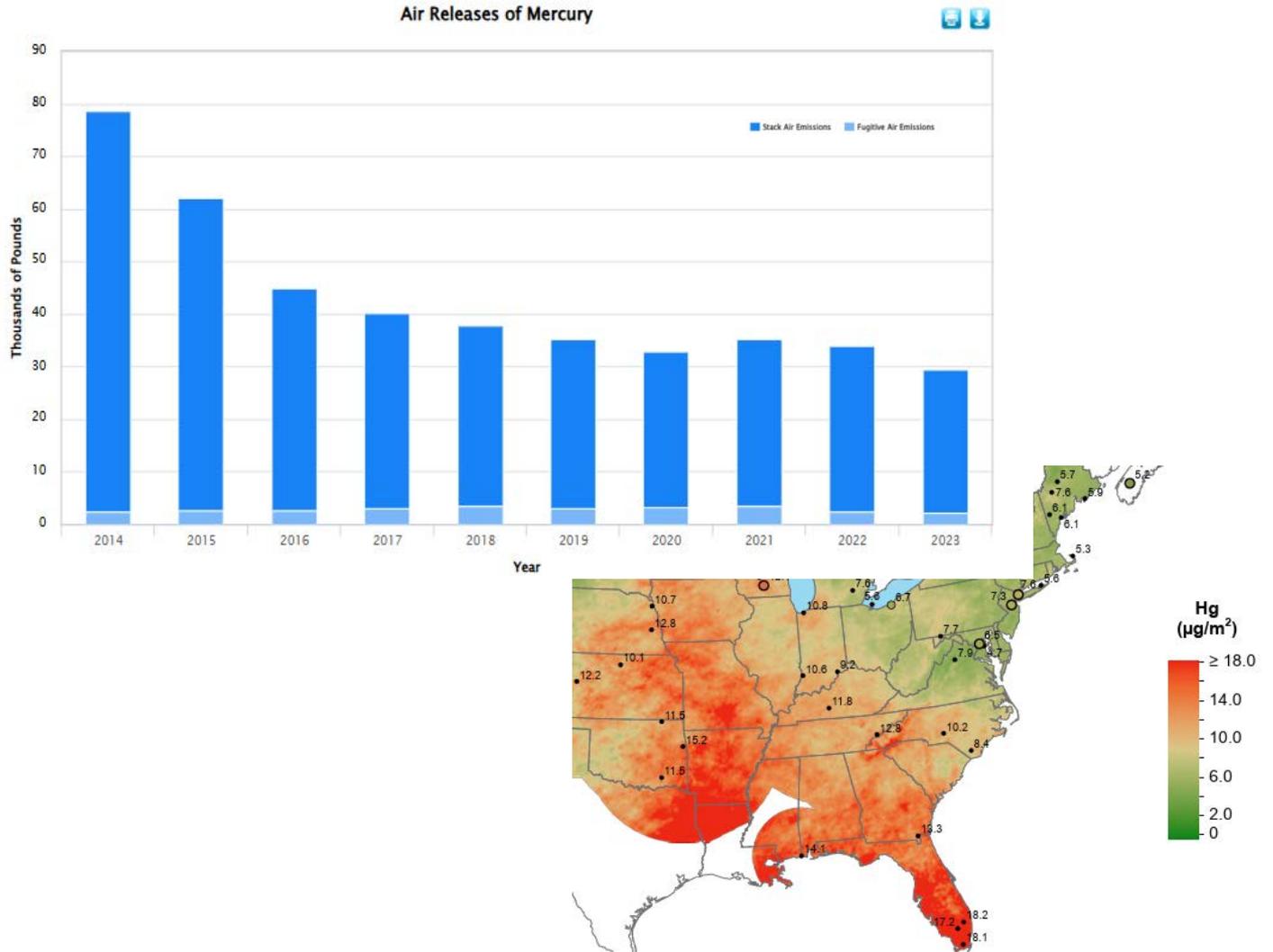
Combustion of coal and lignite
Chlor-alkali plants
Gold mines
Metal refining
Metal smelters
Industrial catalysts
Cement manufacture
Wastewater treatment sludge
Waste incinerators
Batteries
Paints*

Dental amalgams
Medical devices
Pharmaceuticals
Fluorescent light bulbs
Convenience switches
Cosmetics
Wood treatment*
Toys*
Shoes*
Cleaning supplies*
Mirrors*
Laxatives*

*historical



10 Year Mercury Emissions Trend (top) and 2024 Wet Deposition



Sources: USEPA 2025 <https://www.epa.gov/trinationalanalysis/mercury>
NADP 2024 <https://nadp.slh.wisc.edu/maps-data/mdn-gradient-maps/>



Mercury in the Environment

Environmental Fate:

- Two characteristics, volatility and biotransformation, make mercury somewhat unique as an environmental toxicant. Its volatility accounts for much higher levels in the atmosphere than in water or soil. Inorganic forms of mercury can be converted to organic forms by microbial action.
- In aquatic systems, mercury appears to bind to dissolved matter or fine particulates, while the transport of mercury in the air is due to bound to dust particles in the atmosphere; rain deposits mercury (see wet deposition in graphic).
- The conversion of inorganic mercury to methyl mercury in aquatic environments implies that recycling of mercury from sediment to water to air and back could be a rapid process.
- In aquatic systems, Hg processes can be affected by other elements (e.g., Selenium) and conditions (e.g., low oxygen).



Mercury in the Environment

Environmental Fate Continued:

- In the atmosphere, most of Hg is in the volatile mercury vapor form, with reactive gaseous Hg, total particulate Hg, and methyl mercury at lower levels.
- Mercury in the environment is deposited and revolatilized many times, with a residence time in the atmosphere of at least a few days.
- In the volatile phase it can be transported hundreds of miles.
- The highly toxic organic form of Hg in water is methylmercury, and may compromise up to 20% of mercury present.
- The proportion of Hg in water as methyl mercury is of critical importance, as this is the most bioavailable and toxic form of mercury. This form **bioaccumulates** in organisms (aquatic and human) and can have toxic effects.

Sources: Science Direct 2026 <https://www.sciencedirect.com/topics/chemistry/elemental-mercury#:~:text=Air,further%20analytical%20developments%20are%20needed>.

ANZECC & ARMCANZ (2000) guidelines: <https://www.waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/toxicants/mercury->

2000#:~:text=The%20proportion%20of%20dissolved%20mercury,waters%20systems%20polluted%20with%20mercury.

Study.com 2026: <https://study.com/academy/lesson/bioaccumulation-of-mercury-in-humans-plants.html>



Mercury in the Environment

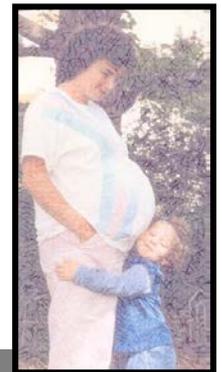
Why Mercury in the Environment is a Concern:

- Mercury is a persistent, bioaccumulative, toxin (PBT).
- Methyl mercury, a known neurotoxin and development inhibitor in unborn babies, is ingested by humans who eat fish that have bioaccumulated the metal from polluted waters. Fish that live longer and are higher in the food chain can accumulate higher amounts of mercury in their tissue.
- Symptoms of mercury poisoning usually begin with numbness and tingling in the fingers and toes, irritability, tremors. High-level, long-term exposure can lead to memory loss, vision loss, hearing loss, psychosis, birth defects, and death. All forms of mercury affect the central nervous system. High levels of elemental, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetuses. Organic forms of mercury, which are found in the edible parts of fish, are the most toxic.



Blood Mercury Levels in US Children and Women Who May Become Pregnant

- Scientists have found that methyl mercury contamination of seafood can cause heart damage and irreversible impairment to brain function in children, both in the womb and as they grow.
- Approximately 6-8% of women had blood mercury concentrations higher than the EPA's recommended reference dose (5.8 ppb) in 2005
- USEPA survey data indicate a decreasing trend (71%) by 2020; consumption guidelines were created to protect human health and data suggest they're working
- Another survey suggests these values may be higher
- Researchers have been unable to identify a threshold below which mercury does not hurt children.



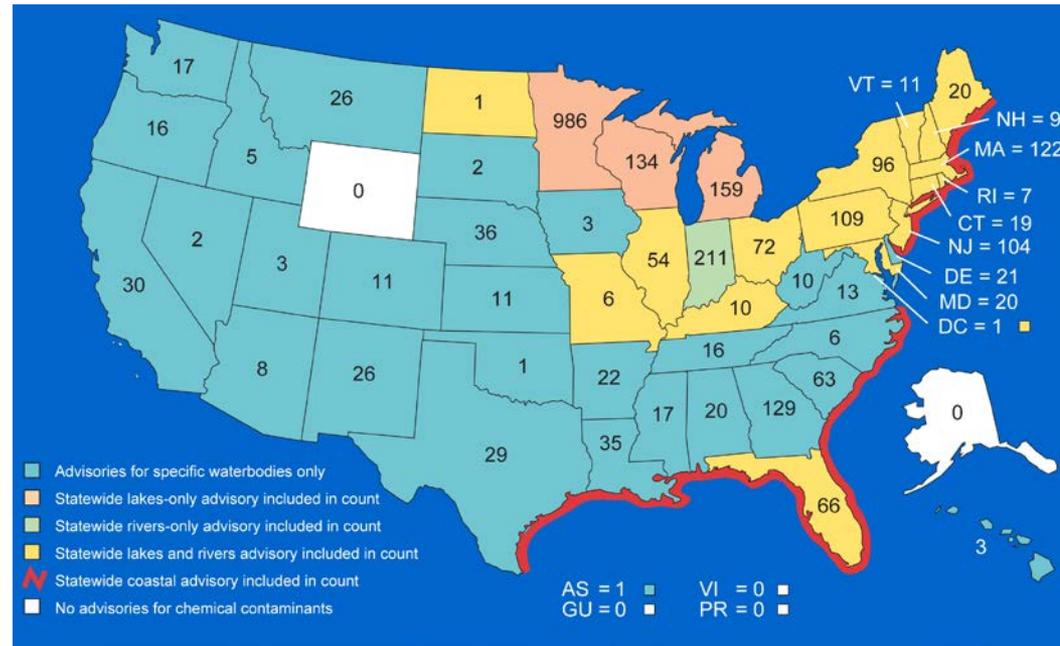
Sources: Mahaffey 2005

<https://pmc.ncbi.nlm.nih.gov/articles/PMC1473138/#:~:text=Methylmercury%20exposures%20among%20women%20of,been%20incorporated%20into%20risk%20assessments.>

USEPA 2025 <https://www.epa.gov/choose-fish-and-shellfish-wisely/support-fish-and-shellfish-advisory-programs#trends> EWG 2016 https://static.ewg.org/reports/2016/mercury-in-seafood/EWG_MercuryinSeafood.pdf#:~:text=Mercury%20emissions%20from%20coal%E2%80%93fired%20power%20plants%20and,womb%20to%20potentially%20harmful%20levels%20of%20mercury



Total Number of Fish Consumption Advisories Nationally in 2002



- National data are not available for the 2020's
- Louisiana's number has increased to 51 (2024)
- In general, mercury advisories are increasing across the US



Mercury in the Environment

Conclusions:

- Mercury in the environment is a serious public health issue for the State of Louisiana and the US as a whole.
- There are continuing man-made emissions of mercury into the environment, overall these are declining.
- Although atmospheric deposition of mercury continues to be a problem, the legacy applications of mercury in agriculture, industry, and medical and consumer products have undoubtedly contributed significantly to the environmental mercury problem in our state.
- While concentrations in fish tissue may be expected to decline over time if sources of mercury contamination are removed or curtailed, this has not occurred. This is likely due to multiple factors.
- The purpose of the LDEQ mercury initiative is to gain a better understanding of the environmental mercury problem in our state and to develop and implement mitigating strategies.

