



2023 MPCA Mercury Updates

2023 Statewide Mercury TMDL Oversight Committee Meeting

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Topics



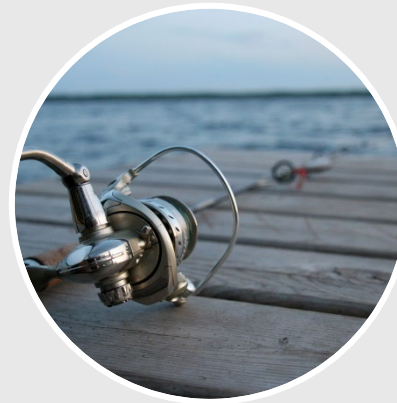
- Why we're here
- Progress towards the statewide mercury TMDL goal
- Mercury reduction efforts
- Taconite mercury reduction plan deficiency letters
- EPA's updates to taconite standards

What's the problem we are trying to solve?



Mercury Impaired Waters

Mercury impairments in Minnesota are mainly based on fish tissue concentration



Mercury Exposure

Mercury emissions eventually move into our ecosystem and bodies



Fish Consumption Advisories

Minnesota Department of Health safe eating guidelines



Mercury Reductions

Minnesota's goals to reduce the amount of mercury that ends up in our waters

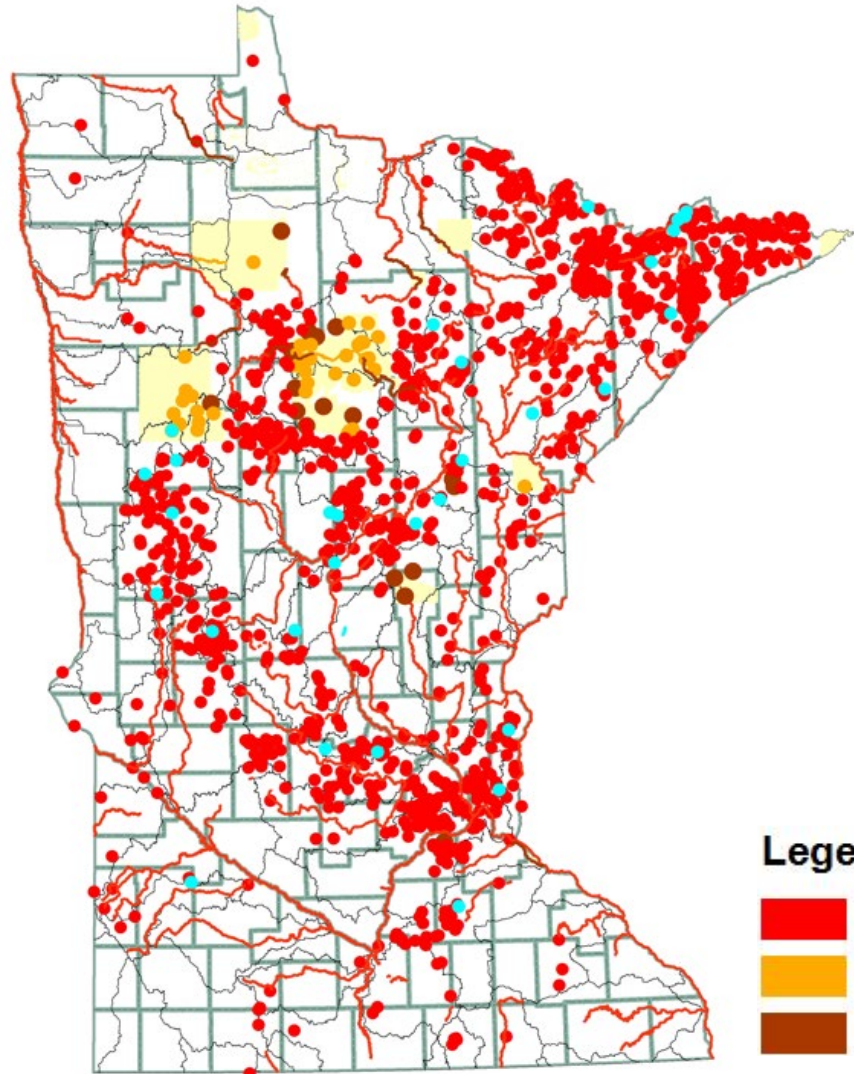
Minnesota's statewide mercury TMDL

- GOAL - reduce statewide mercury air emissions to 789 pounds per year
 - TMDL approved by U.S. EPA in 2007
 - TMDL Implementation Plan in 2009
 - Mercury Reduction and Reporting rule adopted in 2014
- Statewide TMDL Oversight Committee (2008 - Present)
 - Convened based on stakeholder recommendations
 - MPCA called for stakeholders to recommend source-specific reduction targets

Oversight group charge

- Meet during fall each year from 2009 - 2025
 - (at least once every 3 years after 2013)
- Review and evaluate progress toward achieving the Mercury TMDL goals
- Determine if additional measures are needed to meet these goals
- Provide advice to the MPCA on implementing the Mercury TMDL
- Review changes to the mercury emissions inventory
- Review other actions and scientific information that could affect implementation of the Mercury TMDL




Minnesota's impaired waters list



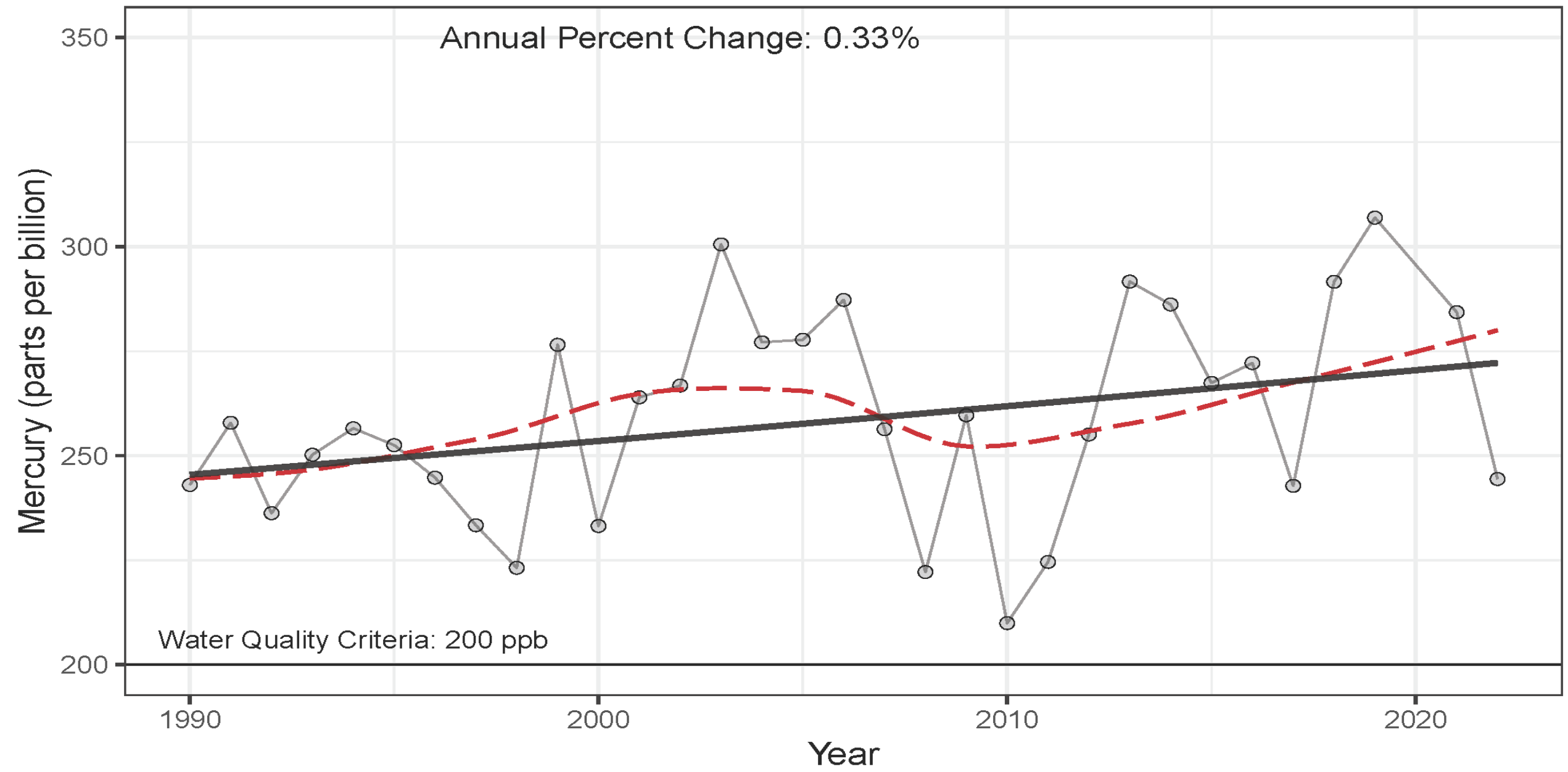
- 2022 impaired waters list

- Approved by EPA in April 2022
- 6,168 total impairments in 2,904 waterbodies
- 1,671 mercury impairments in 1,316 waterbodies

Legend

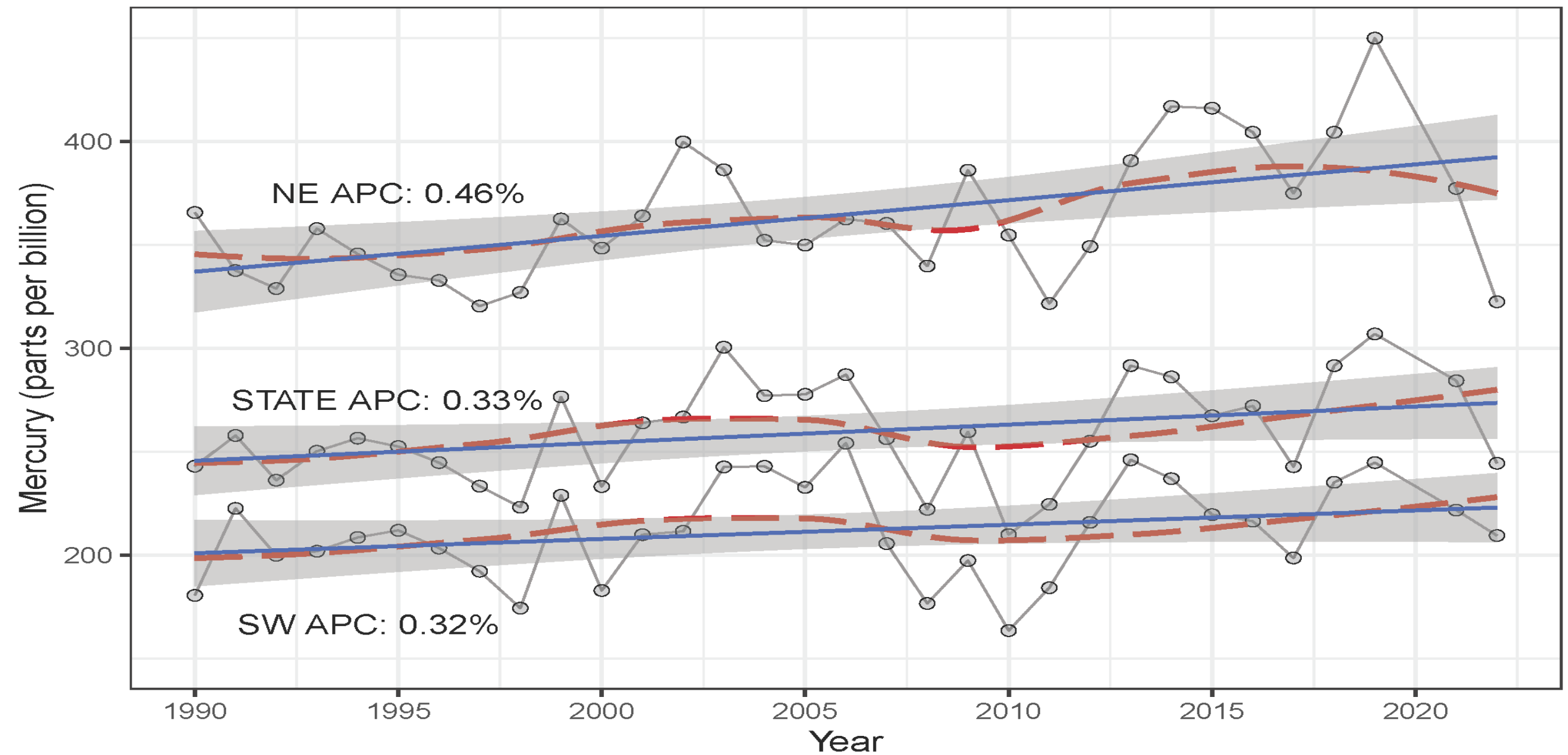
-  Mercury impaired waters
-  Mercury impaired waters wholly within reservation boundaries
-  Mercury impaired waters partially within reservation boundaries

Mercury Trend in Northern Pike and Walleye: 1990–2022

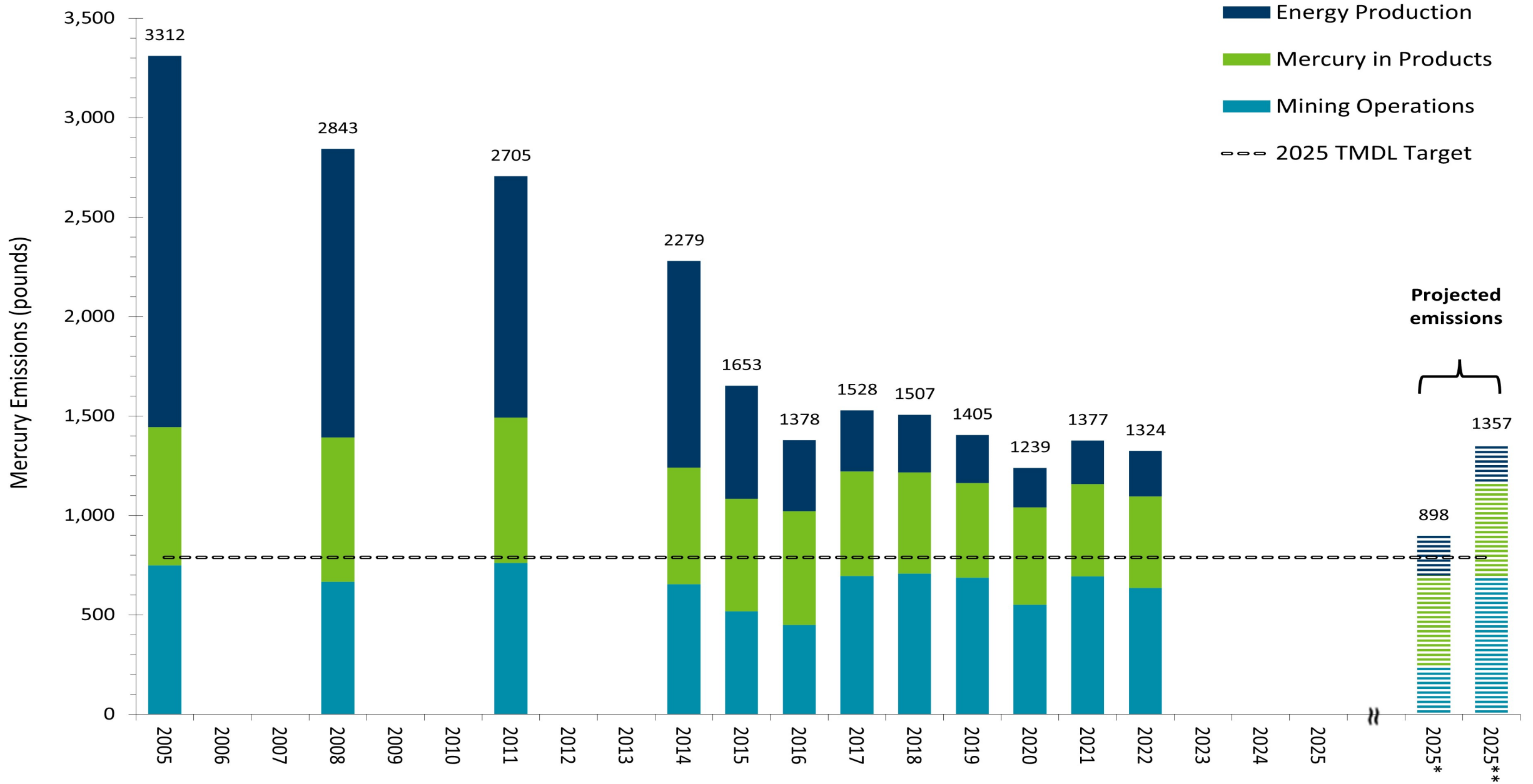


Black Trend Line and Red-dashed Smooth Curve

Mercury Trend in Northern Pike and Walleye: NE, SW, and statewide

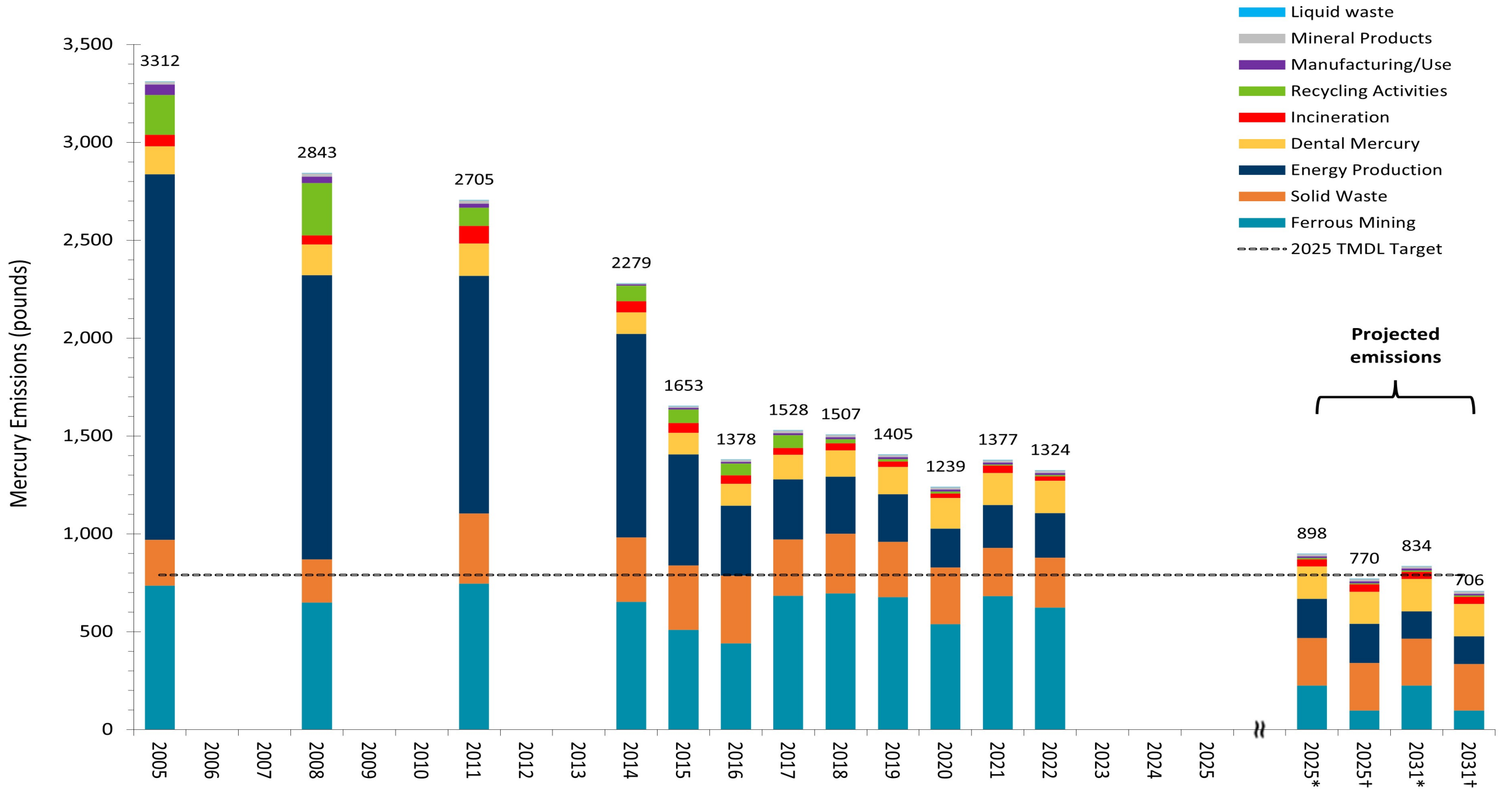


points are conditional means, blue line is mixed model regression line, and red dashed smooth curve



* This projection is based on the ferrous mining/processing industry in northern MN meeting the required 72% reduction specified in Minn. R. 7007.0502.

** This projection is based on the ferrous mining/processing industry's proposed reductions in each mercury reduction plan applied to the baseline emissions as calculated by MPCA.



* This projection is based on the ferrous mining/processing industry in northern MN meeting the required 72% reduction specified in Minn. R. 7007.0502.

† This projection is based on the ferrous mining/processing industry implementing ACI and setting future projected emissions from Mesabi Metallics and Mesabi Nugget to zero.

Great Lakes Commission mercury committee

- Ad Hoc Committee on Mercury - Policy resolution
 - Multiple ecological, social, and economic benefits of the Great Lakes and St. Lawrence River
 - Mercury pollution harms these benefits and the health of communities in the region
 - While we're taking action to reduction mercury uses/emissions, more can be done
 - Suggestions and support for actions to understand and reduce mercury
- <https://www.glc.org/work/advocacy/resolutions/>
- <https://www.glc.org/library/2021-glc-issue-brief-mercury>

EPA's Review of the MATS RTR

- EPA proposed revisions to the Mercury and Air Toxics Standards (MATS)
 - More stringent particulate matter limits for existing coal-fired EGUs
 - More stringent mercury limits for lignite-fired EGUs
 - MPCA commented in support of the more stringent standards
- Impacts for Minnesota
 - Changes to mercury standards primarily effect North Dakota Boilers
 - EPA identified the top 20 mercury emitting boilers (8 were in North Dakota)
 - Potential local impacts via reduced emissions

Social media campaigns

- Raise awareness of household items containing mercury
- Drive behavioral changes to prevent these items ending up in the trash
- Reduce mercury emissions in pursuit of the TMDL goal



Legislative proposal - Mercury lamp phaseout



- Two bills introduced for 2024 session
 - [HF 3326](#) and [SF 3345](#)
- Phases out sale of CFL and linear fluorescent lamps over a 2-year period
- Support Minamata Convention CFL phaseout by 2025
- LEDs now available for virtually all lighting products - more efficient, longer life, no mercury

Legislative proposal - Mercury lamp phaseout

- Significant reductions in mercury use/release, electrical demand for lighting, and costs of lighting
- Supporters:
 - Fresh Energy, Appliance Standards Awareness Project, Clean Lighting Coalition, Partnership on Waste and Energy
 - MPCA supporting but not submitting our own proposal since bills were introduced
- MN may propose addition of mercury vapor lamps, ballasts, ballast kits
- Similar phaseouts enacted in California, Colorado, Hawaii, Maine, Oregon, Rhode Island, Vermont

Grants to reduce mercury/sulfate

- 2023 Legislative session
 - Budget proposal for \$16.7M in grants to implement technologies to treat “difficult-to-manage pollutants” at taconite facilities
 - Appropriation is available until June 30, 2027
- MPCA in the process of setting up the grant program
 - Starts with agree upon workplan and executed grant contract
 - Goal - workplans in early 2024
 - Continuing to meet with taconite industry
 - Point of Contact: Sarah Remer (Supervisor, MPCA Technical Services Unit)

Taconite mercury reduction plans

- Each facility submitted a reduction plan and they are available online here:
 - <https://www.pca.state.mn.us/air/plan-reduce-mercury-releases-2025>
- Reduction plan overview (submitted in December 2018):
 - Two facilities proposed reductions meeting the 72% reduction specified in the rule.
 - Two facilities submitted alternatives plans with less than a 72% reduction.
 - Four facilities submitted alternative plans with no proposed reductions and outlined further evaluations.
- MPCA staff have reviewed each plan and identified deficiencies for the industry

MPCA's action on taconite mercury reduction plans

- Found proposed reduction plans deficient from:
 - Hibbing Taconite, Minorca Mine, United Taconite
 - U.S. Steel - Minntac, U.S. Steel - Keetac
- Key reasoning for deficiency finding from reduction plan review
 - Facilities' conclusions that a 72% reduction is not technically achievable was not adequately demonstrated
 - Three MPCA identified technologies are commercially available, don't impair pellet quality/production, don't cause corrosion in equipment, and achieve at least a 72% reduction
 - MPCA economic analysis shows that the control strategies are affordable

MPCA's action on taconite mercury reduction plans

- Sent deficiency letter to facilities (January 6, 2023):
 - Identified reasons for finding the facilities' submitted plans deficient
 - Requested facilities revise plans to implement one of the three identified technologies
 - Each of these technologies was eliminated only based on the associated costs
 - Included MPCA's economic impact analysis, which examines affordability, with the letter
 - Requests facilities resubmit the plans within six months of EPA final action on revised federal taconite standards
 - Resubmittal timing would be roughly May/June 2024 (six months after November 2023)

MPCA technical review - Taconite reduction plans

- Industry concerns:
 - Technically/economically feasible, maintains pellet quality, doesn't cause corrosion
 - Mercury speciation and deposition
 - Compliance concerns for other regulatory requirements
 - High costs to implement the evaluated technologies
- MPCA review:
 - Initial review identified various deficiencies and requested additional information
 - Deficiency letters finalize MPCA position that a 72% reduction is achievable
 - Identifies three technologies that were rejected by the facilities only due to costs

MPCA economic impact analysis - Taconite mercury controls

- Taconite facilities included an estimate of control technology costs
 - Identified a cost threshold of \$7,100 per pound of mercury removed for evaluating costs
 - Based on EPA estimates of the cost of mercury reductions in various federal standards
- MPCA evaluated the affordability of the control technologies presented
 - Based on costs of mercury control technologies as prepared by the taconite facilities
- Key conclusions
 - There is not a clear case that complying is unaffordable and complying is economically achievable
 - Cleveland Cliffs and U.S. Steel are in good market positions and market outlook for iron/steel is positive

EPA's Taconite Iron Ore Processing Standard

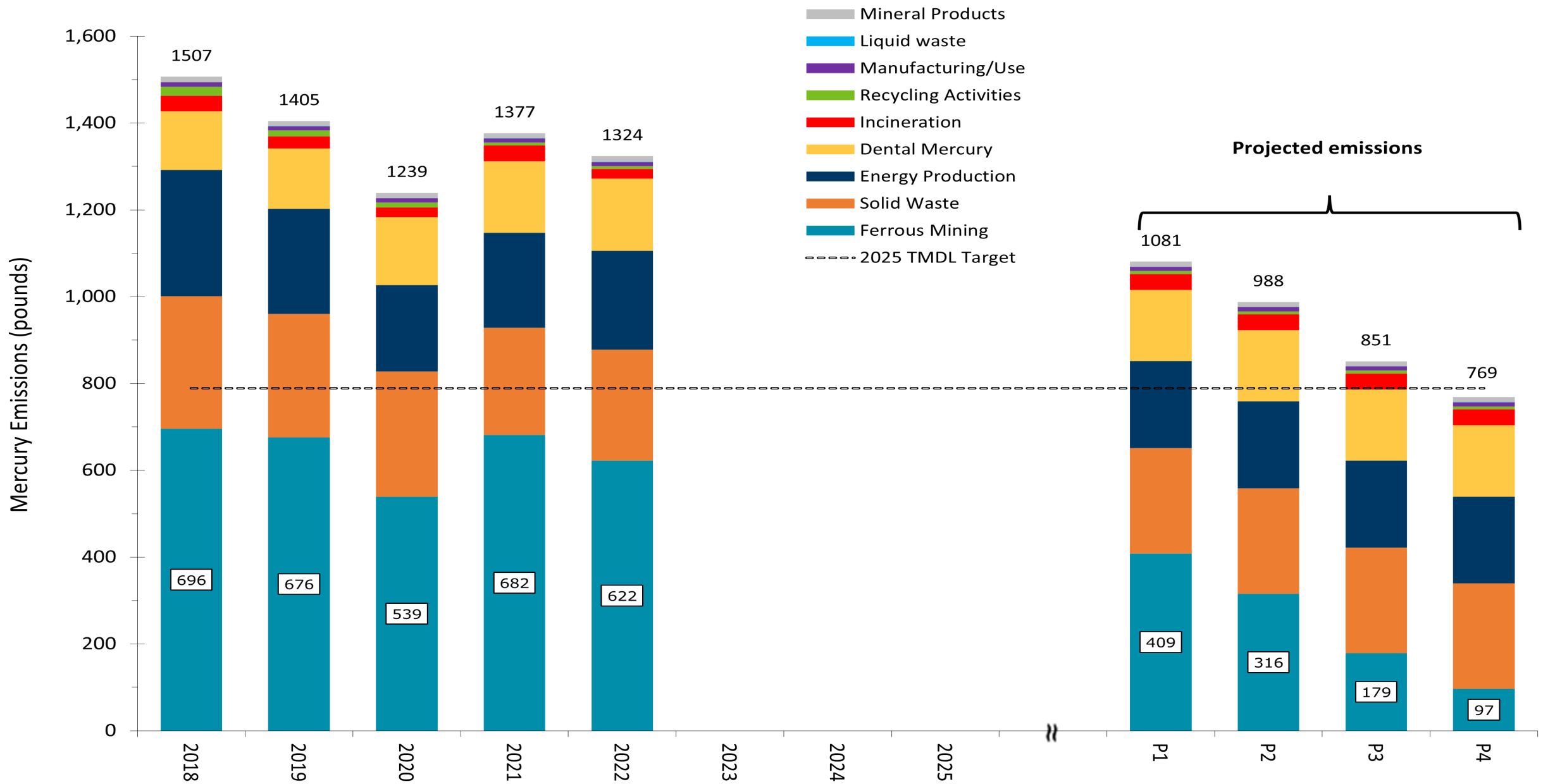
- Clean Air Act (CAA) and the National Emissions Standards for Hazardous Air Pollutants (NESHAP)
 - Requires EPA to promulgate NESHAPs for major sources of HAPs
 - Identifies HAPs, including mercury
 - Requires that EPA evaluate whether there are technology improvements every 8 years
- Taconite Risk and Technology Review (Taconite RTR)
 - Comments, petitions, and early stakeholder input/review
 - Proposed rule published in May 2023; Final rule from EPA due by November 2023

Summary of EPA's proposed taconite standard

- Establishes mercury emission limits for indurating furnaces (technology review)
 - Existing furnaces: 14 pounds per million long tons of pellets produced (lb/MMLT) or an average 12.6 lb/MMLT across multiple furnaces at one facility
 - New furnaces: 3.1 lb/MMLT
- High efficiency scrubbers w/ activated carbon injection
 - Total capital investment: \$90M - \$130M (averaging vs. individual scenarios)
 - Total annual cost: \$52M - \$71M (averaging vs. individual scenarios)
 - Cost effectiveness: \$105,000 - \$154,000 per pound of mercury removed
- Also evaluated affordability of the capital investment and annual costs (i.e., less than 0.5% cost-to-sales ratio for both capital/annual costs)

Summary of EPA's proposed taconite standard

- Revised emission limits for acid gases (Hydrochloric and Hydrofluoric acid)
- Establishes the operating limits, monitoring, recordkeeping, and reporting requirements
- Requires performance testing every 2.5 years (same as PM standards)
 - Initial performance test within 180 days after compliance date
- Estimated compliance date for new mercury limits in a final EPA rule is November 2026
- 17 comment letters were submitted on the proposal
 - Industry, industry advocacy groups, individuals, FLMs, a mercury control equipment manufacturer, state agencies, Tribes, and environmental groups



Projected emissions

P1 - This projection is based on the taconite processing industry meeting EPA's proposed alternative mercury compliance option (facility average emissions of 12.6×10^{-6} lb/LT).
P2 - This projection is based on the taconite processing industry meeting EPA's contemplated 30% more stringent mercury limit (emissions limit of 9.8×10^{-6} lb/LT).
P3 - This projection is based on the taconite processing industry meeting the required 72% reduction specified in Minn. R. 7007.0502.
P4 - This projection is based on the taconite processing industry implementing ACI that achieves an 85% reduction in mercury emissions.

MPCA comments on EPA's proposed taconite standard

- Supported mercury control standards and urged EPA to set more stringent mercury limits
- Evaluated EPA's cost evaluation
 - Control efficiency ranged from 13% - 78%
 - Cost effectiveness (~\$154,000/lb) vs. incremental cost effectiveness (~\$46,000/lb)
- Provided our own cost estimates using EPA's methodology
 - Control efficiency ranged from 46% - 85%
 - At an 85% reduction: ~\$147M in capital costs, ~\$90M in annual costs
 - Cost effectiveness (~\$105,000/lb) vs. incremental cost effectiveness (~\$32,000/lb)
- Commented on other various aspects of the proposal

Moving forward

- Greater emissions reductions are needed to meet the goal of the statewide mercury TMDL.
 - About 73% of our waters will reach the goal if the TMDL reductions are fully implemented
 - The remaining 27% need more work to resolve the higher mercury levels in fish
- Continue to promote mercury emission reductions within the state as well as regionally, nationally and globally
 - Successful programs are the result of collaborative efforts and can involve a wide variety of participants
 - Without additional reductions in the ferrous mining and processing sector, the statewide mercury TMDL goals are unachievable