Minnesota Pollution Control Agency

Environmental Aspects of Mining & Mineral Law

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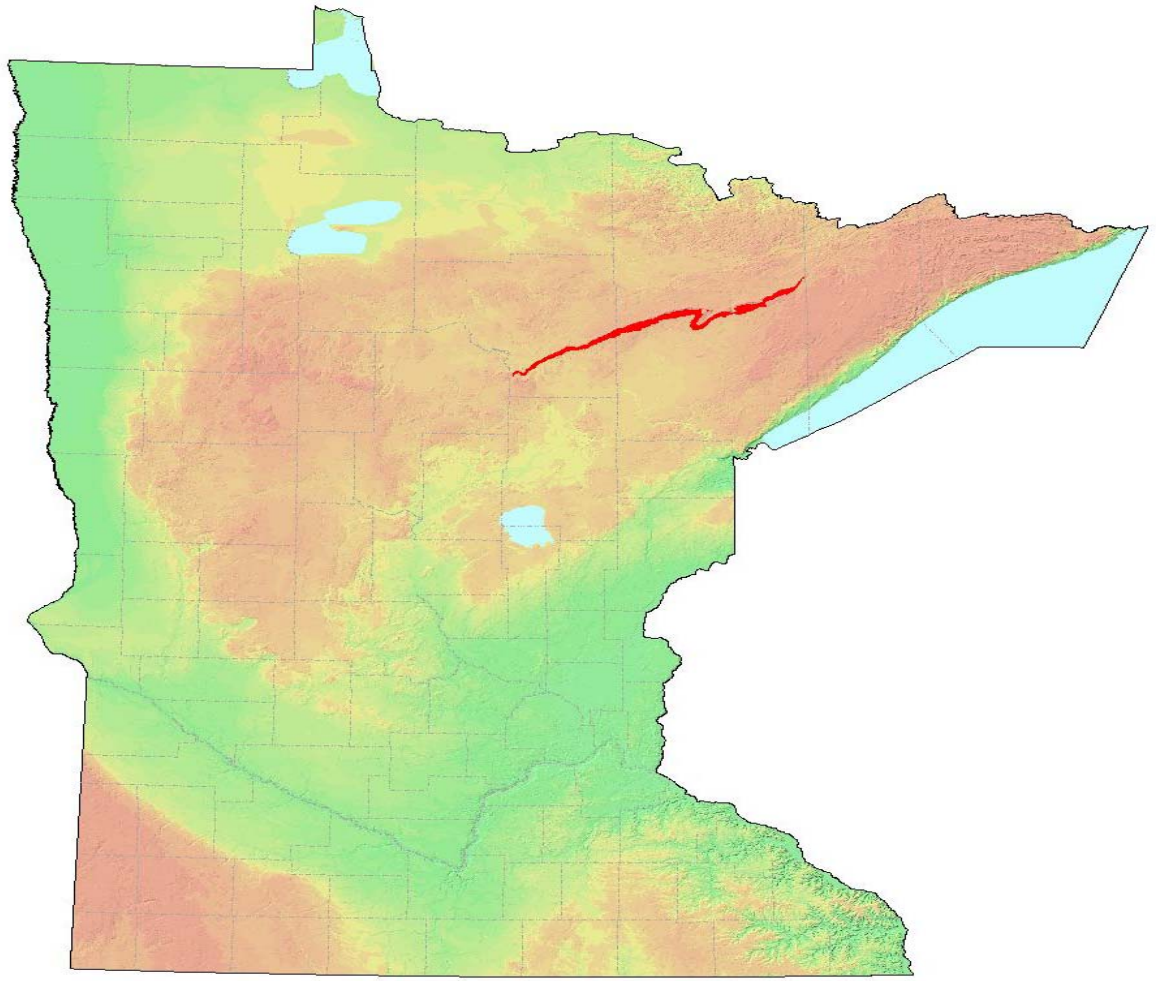
April 23, 2009

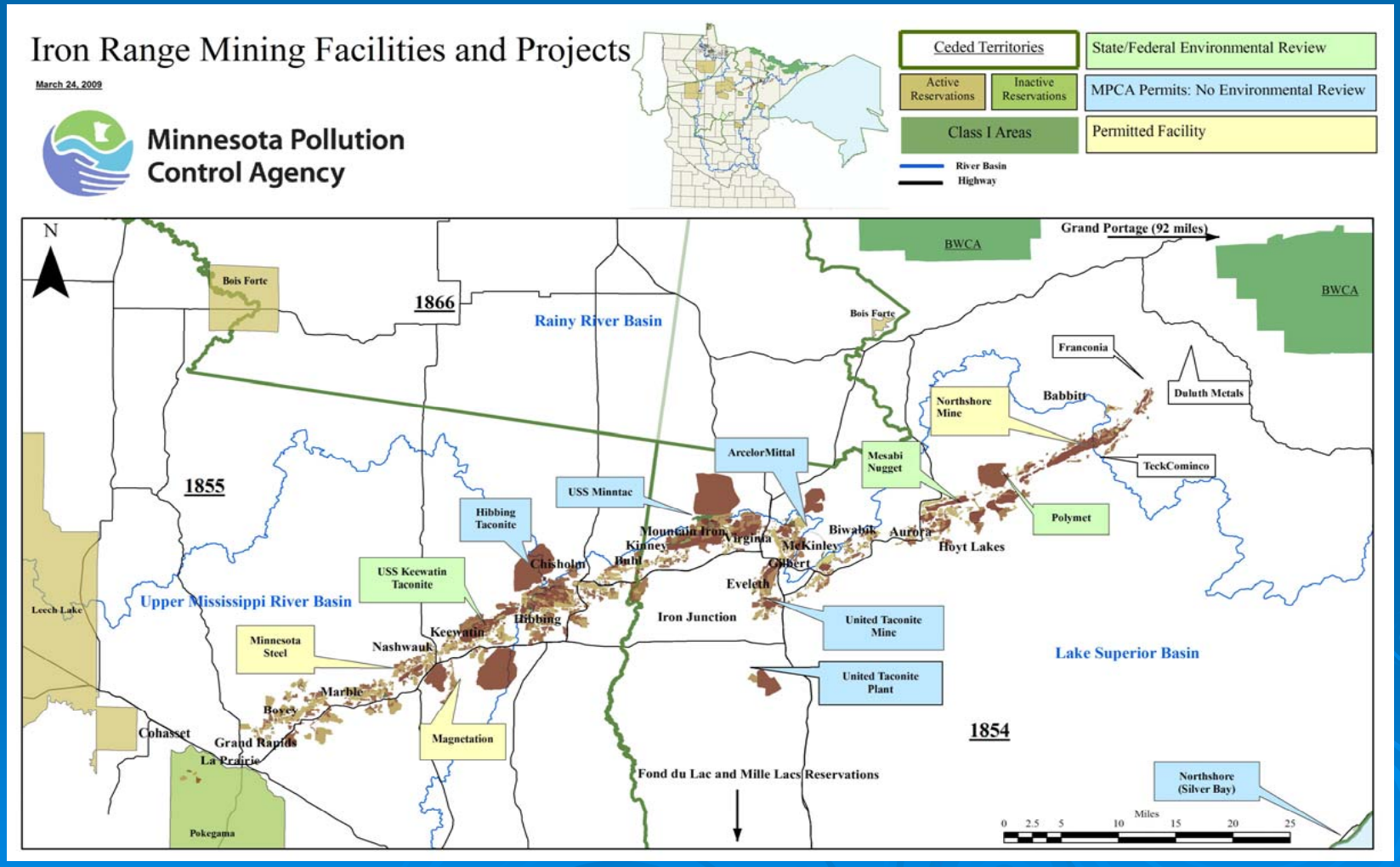
Overview

- Background
- MPCA Role
- Air Quality Issues
- Water Quality Issues
- Summary

Mesabi Iron Range



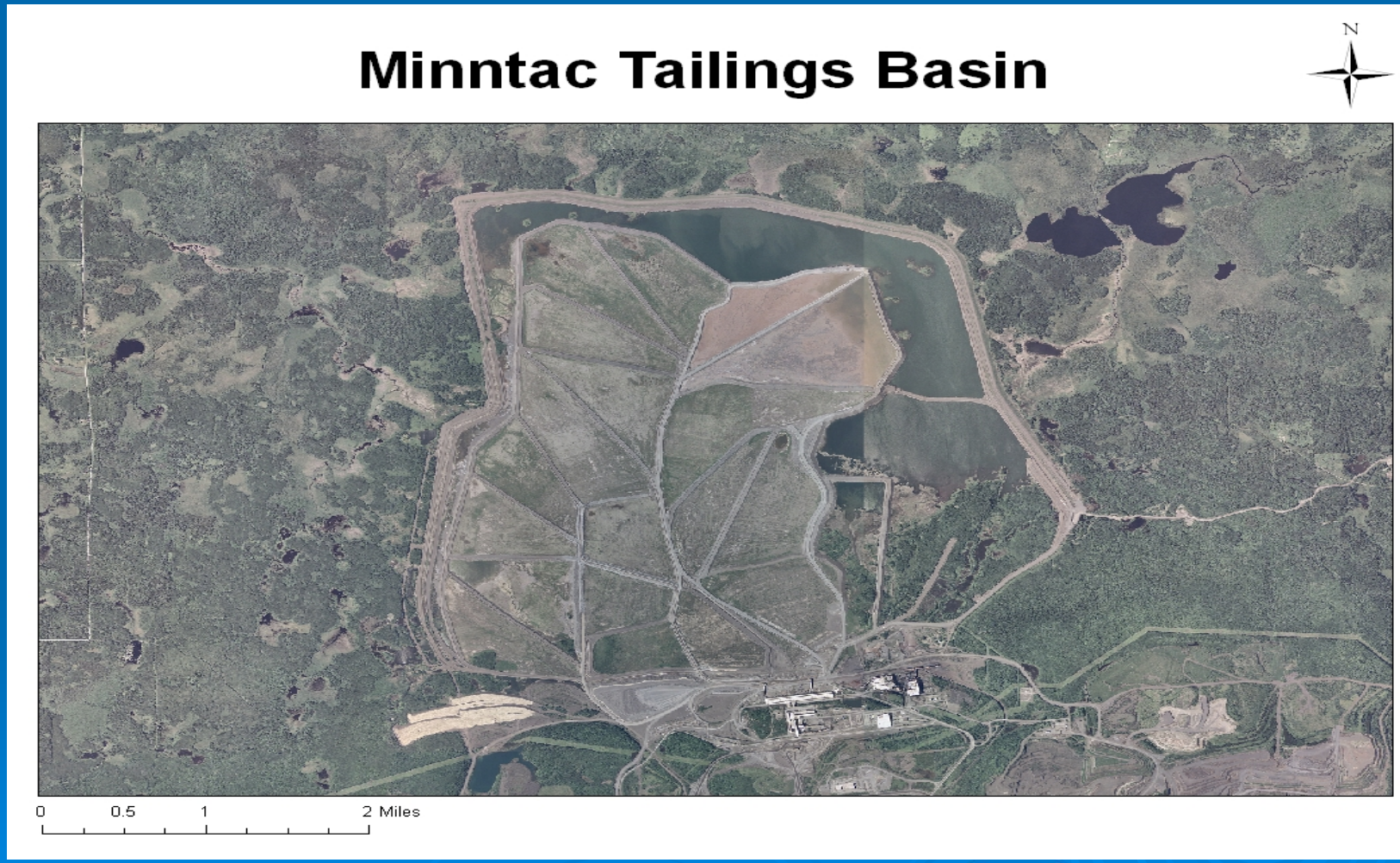
Iron Range Projects



Mining Processes

- Open Pit Mining
- Crushing, Concentrating Ore
- Refining Ore
  - Iron pellets produced in indurating furnaces
  - Nonferrous materials refined in hydrometalurgical processes
- Remaining “tailings” stored in basins

Scale



Scale


Downtown Minneapolis
N
Minntac Basin Outline
Metrodome
Lake Calhoun
0
0.5
1
2 Miles

Iron Range Mining Projects

- Facility Expansions, Modifications
  - Keetac – Line 1 Restart, Mine Expansion
  - United Taconite – Alternate Fuels
- New Processes
  - Mesabi Nugget – Mining and Processing
  - Magnetation – Iron Recovery
- Metallic Nonferrous Development
  - Polymet – Copper, Nickel, Others

MPCA Role: Permitting

- Air Emissions (PSD/Title V)
- Water Discharge (NPDES/SDS)
- Construction Stormwater
- Industrial Stormwater
- Section 401 Certification (wetlands)
- Storage Tanks
- Solid Waste
- Hazardous Waste

Major Air Issues

- Regional Haze
- Visibility
- PM2.5
- Climate Change/Greenhouse Gases
- Mercury
- Fibers

Regional Haze

- Regional Haze Rule
  - Natural Conditions in Class I Areas by 2064
- Few Cost Effective/Feasible Controls for Taconite
- Long Term Strategy
  - Emission Reduction Goals and Tracking
  - Research on Pollution Control Options
- SIP Status

Visibility

- Analysis Required Under Prevention of Significant Deterioration Program
- Federal Land Manager Role
- Issues of Mining Projects
  - Proximity
  - No Proven Control Technology
- Control Technology Research Ongoing

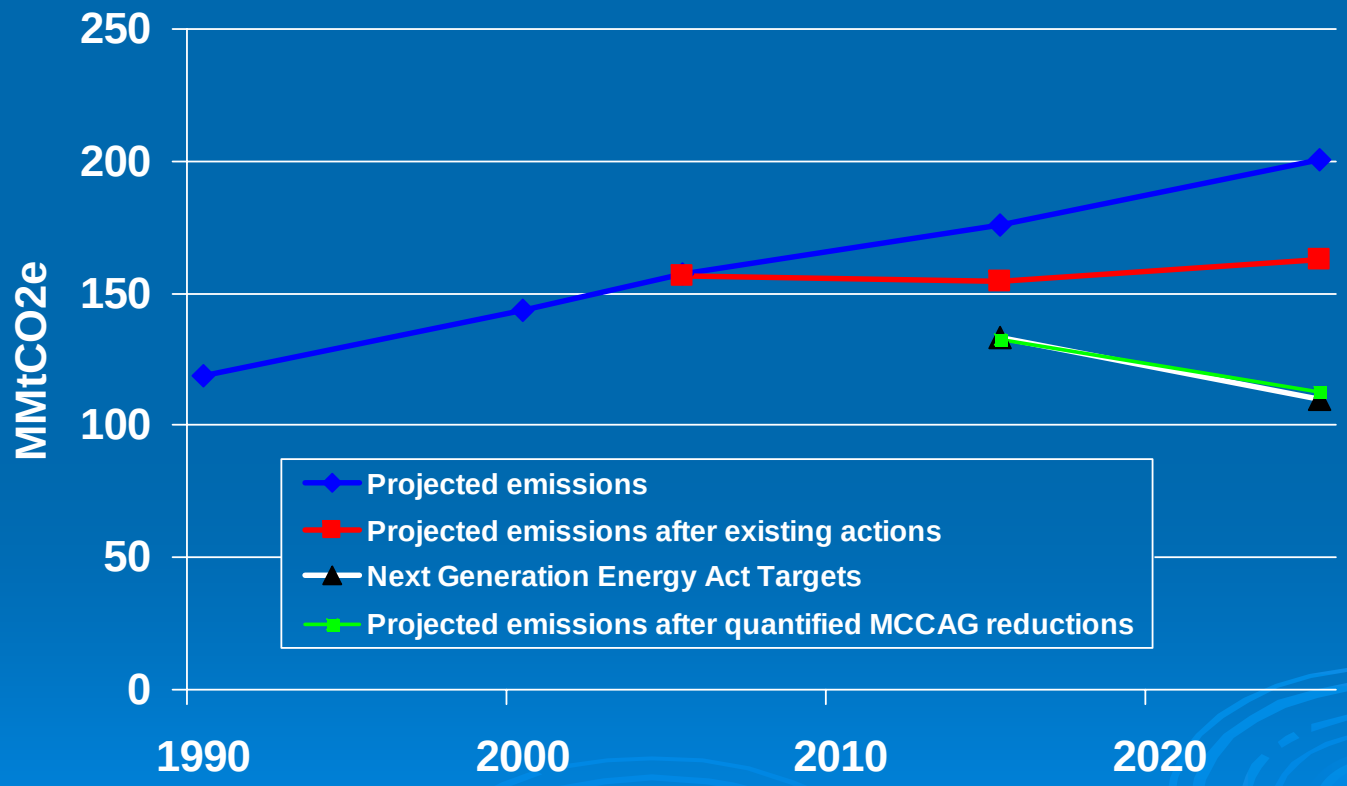
Fine Particles – $PM_{2.5}$

- Federal Rules Promulgated
  - PSD Significant Emission Rates
  - National Ambient Air Quality Standards
- Additional Components Expected
  - PSD Increments
- Complexities
  - Emission Factors
  - Source Testing

Climate Change

- Global Issue
- Environmental Review and Permitting
  - Current MPCA Practice
  - Upcoming…
- MN Climate Change Advisory Group

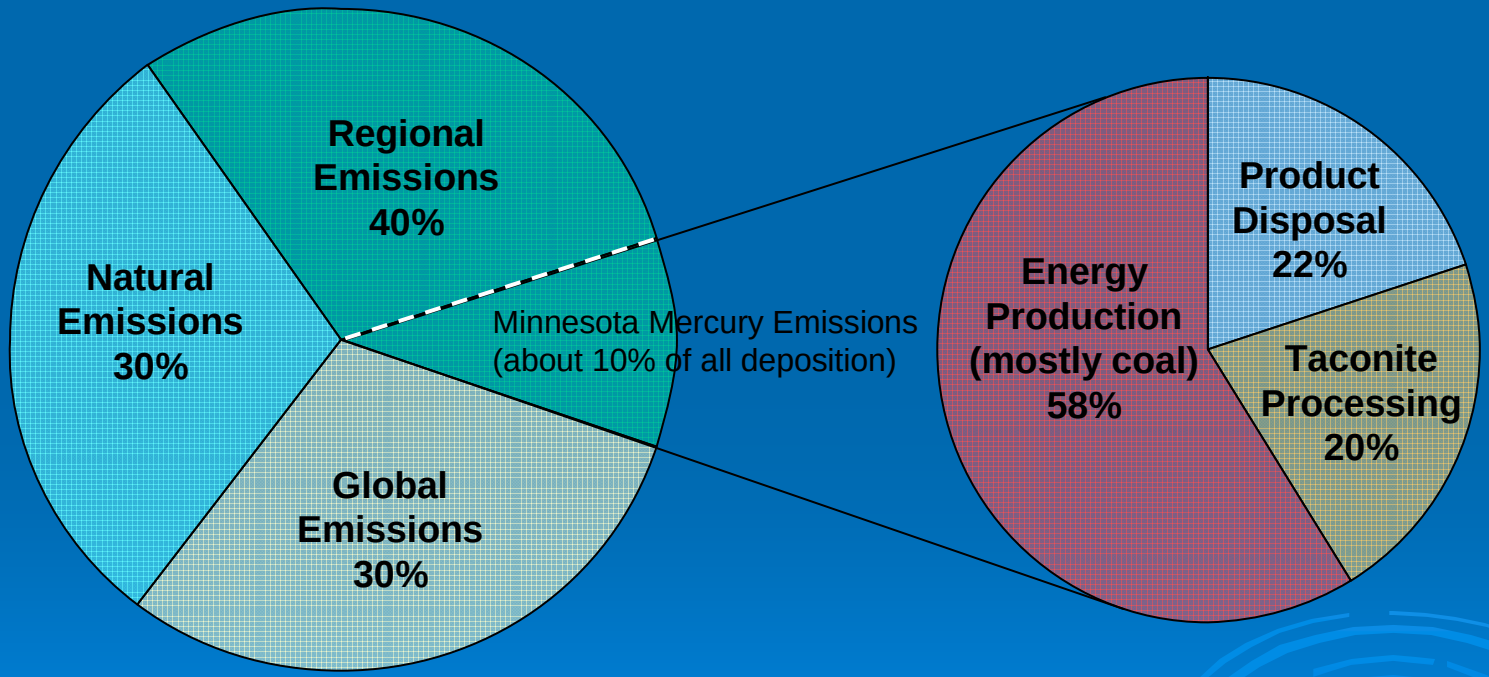
Future Emissions



Mercury

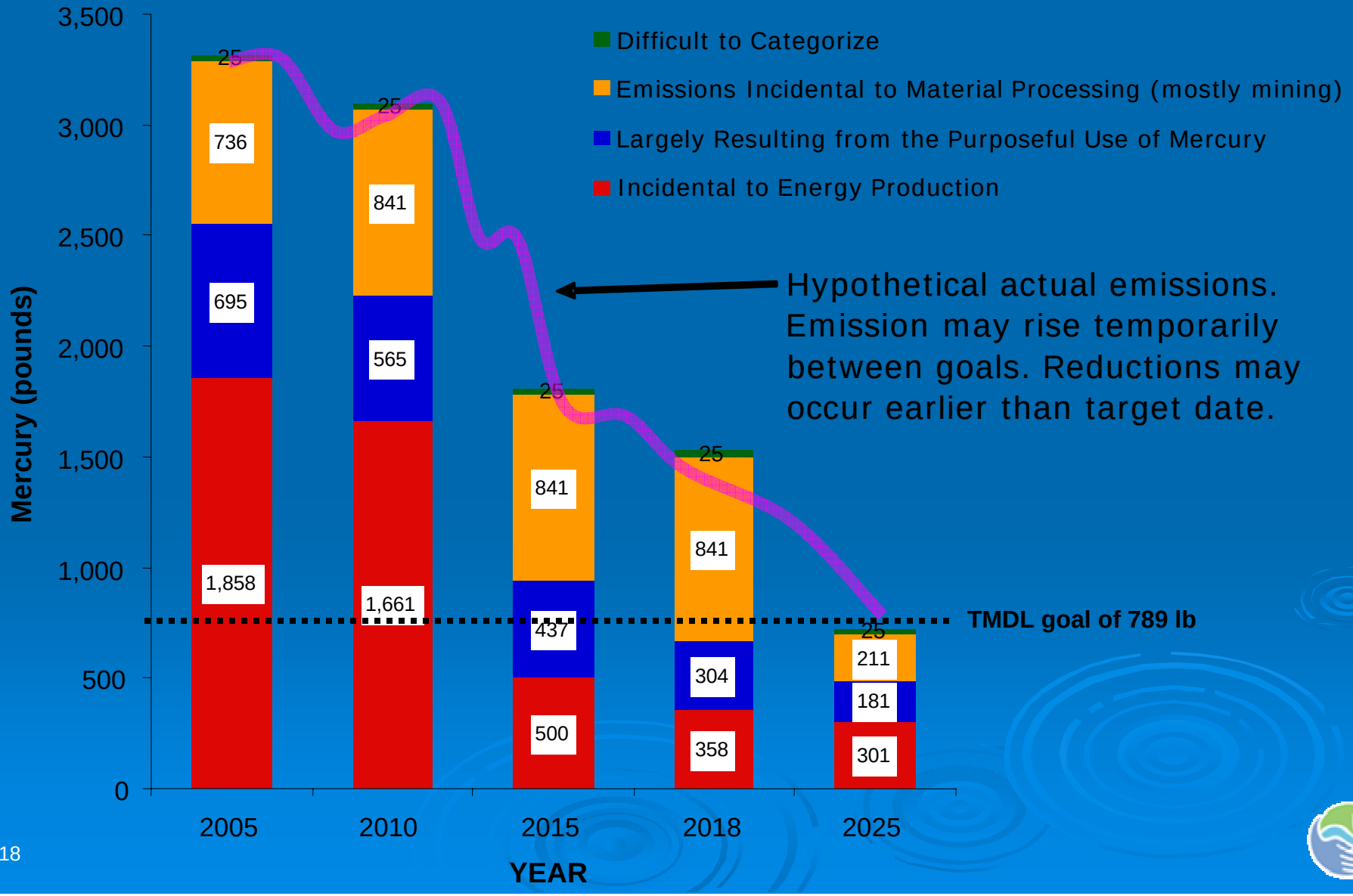
- Current Conditions
  - 2/3 of Lakes, Rivers Impaired Due to Mercury
  - Most (>95%) Mercury Contamination From Air Sources
- Mining Facilities Release Mercury from Fuels, Ore
  - No Proven Controls
- Water Issues
  - Lake Superior Basin Mercury Limit: 1.3 ng/L

Mercury Deposition Sources



Projected Mercury Emissions 2005-2025

Based on reduction targets established by the Strategy Work Group



Mercury: Next Steps

- Total Maximum Daily Load (TMDL) Implementation Plan
- New & Expanding Sources
- Mercury Control Technology Development
- Regional, National, International Reductions Needed

Fibers & Health Issues

- Fibers Present in Some Ore
- Ongoing Litigation
- Health Studies Underway
  - Health Based Standard Development
  - Taconite Worker Health Study

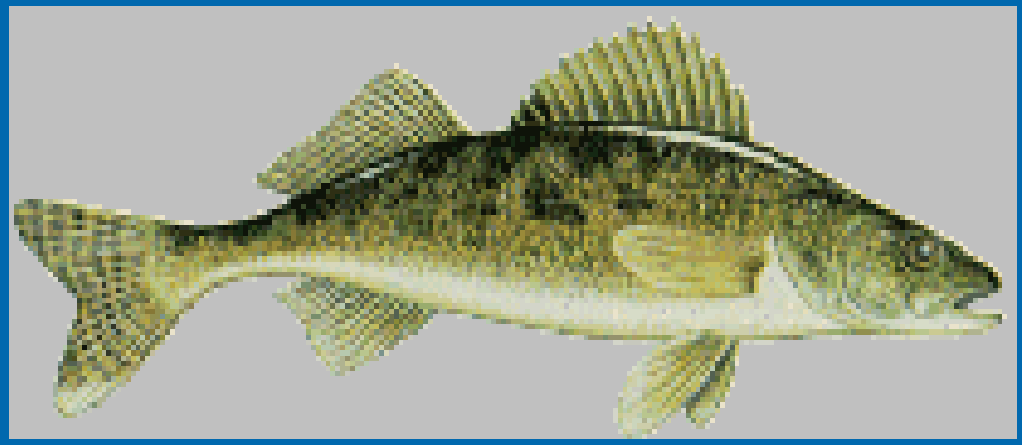
Major Water Issues

- Sulfate Discharges
- Acid Mine Drainage
- Impaired Waters
- Inter-Basin Water Transfer

Sulfate

- Sources
  - Wet Air Pollution Control Equipment
  - Mine Pit Dewatering, Basin Seeps
- Issues
  - Wild Rice
  - Mercury

Mercury Methylation



CH_3Hg^+

$SO_4^=$

Sulfate-reducing bacteria

Hg^{++}

$C_{organic}$

$S^=$

Acid Mine Drainage

- Nonferrous Mining Extracts Sulfide Minerals
- Metals and Sulfate Created From Sulfide, Water, Oxygen
- Dissolved Metals and Acid May Impair Watersheds

Acid Mine Drainage

Acid Mine Drainage Prevention

- Thorough Environmental Review & Permitting
- Possible Preventative Measures
  - Waste Rock Processing to Remove Sulfur
  - Sub-aqueous Waste Rock Disposal (Reduce Oxygen Exposure)
  - Chemical Additions to Stockpiles

Impaired Waters

- Minnesota Must Assess Water Quality Standard Compliance
  - "Failing" Water Bodies Considered Impaired
  - Total Maximum Daily Load (TMDL) Study Must Be Completed
- Permitting Difficult in Impaired Waters if no TMDL
- Variances

Inter-Basin Water Transfer

- Great Lakes Basin Compact Precludes Transfer of Water Between Basins
- Several Basins Meet on Iron Range
- Mining Facilities Must Watch Potential Transfers

Summary

- Existing Rules, Regulations Make Permitting (Appropriately) Difficult
- New Regulations, Issues Continue
- New Projects Proposed
- MPCA Working on Creative Solutions