Historical Pollution Issues in Lake Superior and Northwestern Ontario

Geography of the Lake Superior: Geog. 3633


Mercury
Past . . . Current . . . Future

Quicksilver - Elemental Mercury

- Mercury – before its toxic effects were known – was used to decorate, to develop photos and even to heal the sick. Mercury is still used in batteries, in cosmetics and in CFLs

- In 1700s and early 1800s during the fur trade on the Great Lakes toxic mercury was associated with this commerce. The mercury still lingers, more than 200 years later in northeastern Minnesota, next to Lake Superior.

- The Grand Portage, a 16.5 km portage/footpath was a route for fur traders by various waterfalls and rapids of the Pigeon River. Traders from Montreal associated with the Northwest Company met and traded with those returning from the west and local Ojibway people.

Furs on display at Grand Portage

photo by Layne Kennedy/ Corbis

Today, this historical site has another distinction: Surrounding soil the monument has elevated levels of methylmercury

Methylmercury: more toxic properties than elemental mercury

- One of the items traded at Grand Portage was vermillion, a mercury-containing pigment.

- Researchers recently measured methylmercury levels in soil and streams surrounding Grand Portage and suspect historical fur trade activity is responsible, at least in part for elevated readings. "The monument's soil has an estimated 3 times more mercury per amount of organic carbon - which is what mercury binds to . . . " than five other nearby parks (Brian Bienkowski, **Scientific American**, February 23, 2015)

Past and Present of the Grassy Narrows First Nations People

by Mark Planenta and Graham Saunders

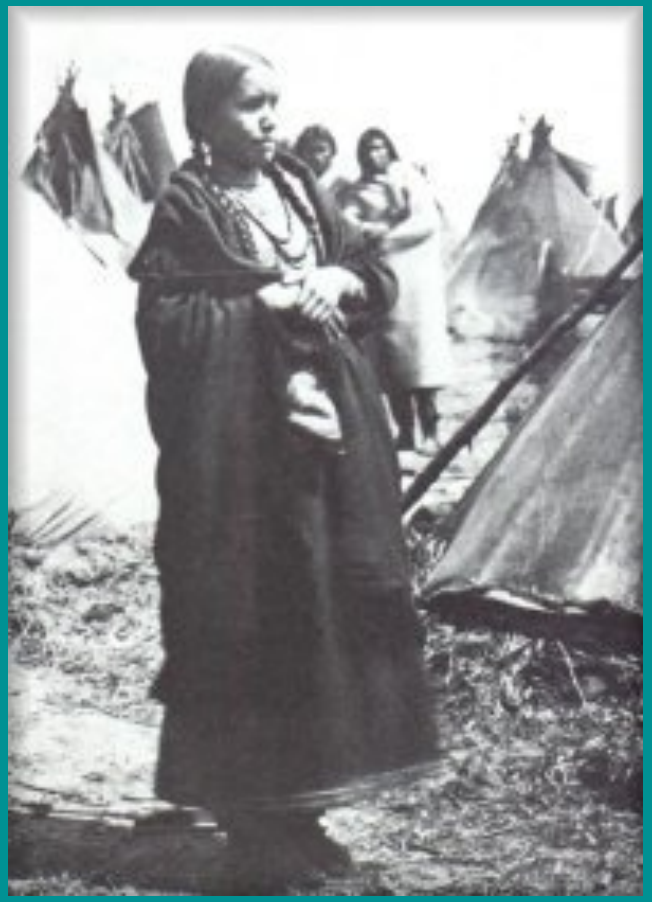
Early history of the Grassy Narrows people

- Long ago the Ojibway were believed to have migrated from near the Atlantic Ocean, westward across what is now Canada.
- In the 1700s the Northern Ojibway, or Anishinaabe were located in what is now Northwestern Ontario
- Family groups were grouped into small and mobile clans. These groups concentrated on trapping and trade with the Hudson Bay Company and/or the Northwest Company.
- Trading posts became the locations of summer gatherings for many Anishinaabe families, which increased European influence.


Sandy Lake
Berens River
Pikangikum
Red Lake
Grassy Narrows
Gimli
Pine Falls
Neepawa
Selkirk
Winnipeg
Sioux Lookout
Kenora
Dryden
Steinbach
Morden
Atikokan
Fort Frances

History of Grassy Narrows (cont.)

- The majority of Grassy Narrows families gathered at the main trading post on Lac Seul, or at some smaller outposts on the English River.
- In 1882 family groups were given two reserves, one was located near the current reserve at Grassy Narrows and another at Wabauskang.
- In 1911, the Hudson Bay Company established a trading post at the old reserve of Grassy Narrows.



According to Stories Remembered by the Elders

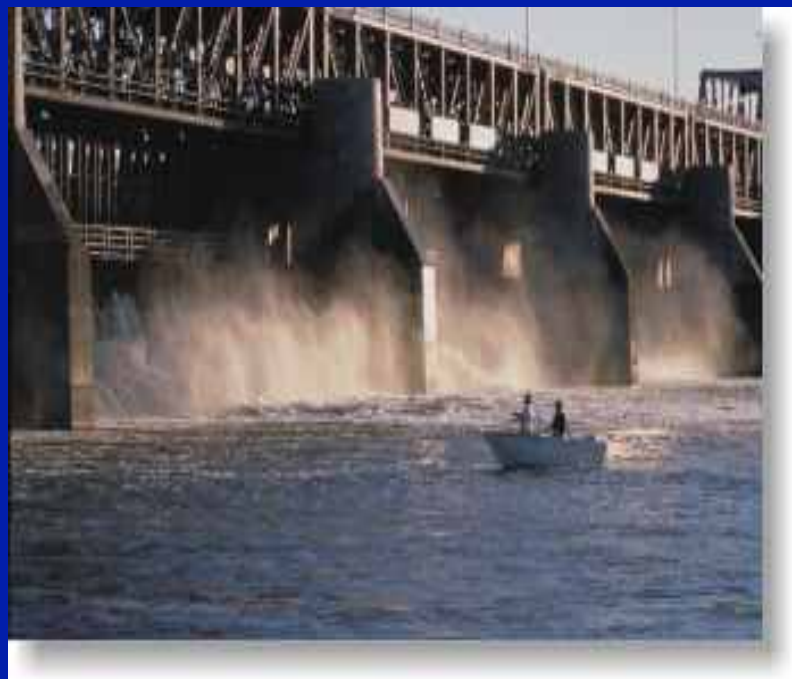
- Wabauskang was probably the main gathering site.
- Then an influenza epidemic hit Wabauskang in 1919 and killed most people.
- The only survivors were the families who were still on their trap lines when the epidemic hit.
- The Chief at this time, Charles Pierrot, decided that the remaining people should move away from Wabauskang, which was cursed, to the site of the old Grassy Narrows reserve, which was considered to be sacred ground.
- Grassy Narrows people of today consider themselves to all be from one of the ten families which survived the influenza epidemic.

Residential Schooling

- From 1876 to the 1970s many Grassy Narrows children were required to attend the McIntosh Indian Residential School. This school was located in McIntosh, Ontario.

In the 1950s Ontario Hydro constructed two dams on the English-Wabigoon River system

- This severely damaged wild rice fields, fish spawning and habitat for animals.
- The fluctuating water levels also made the ice unsafe for travelling to traplines in winter.
- Another devastating result of the hydro projects was the destruction of Grassy Narrows burial grounds and sacred sites.



In 1963, the Department of Indian Affairs Kenora office relocated Grassy Narrows families

- It was relocated to its present location because Kenora was the closest regional centre, and the old reserve was not accessible by road.
- Road access was said to allow the Federal Government to provide the Grassy Narrows people with modern conveniences such as medical attention, social services, electricity, water, sewage and decent housing.
- The current reserve is located eight kilometres southeast of the old reserve.

This move coincided with community devastation

- In the period of 1959-1963, 91 percent of all deaths in the community were due to natural causes.
- By the mid-1970's, only 23 percent of all deaths could be traced to old age, illness, or accident.
- During 1974-1978, 75 percent of all deaths were due to alcohol or drug-induced violence.
- Mercury connections?

By 1980 the community of 540 people

- 60 children under the age of 16 were in the care of the Ontario Children's Aid Society.
- 58 children were under the supervision of Probation Aftercare Services
- Twenty five young adults were under the supervision of the Probation/Parole Service

In 1972 people informed that their fresh water, the English-Wabigoon River system, was contaminated

- Mercury had been released from the Reed Paper Mill (Dryden) 320 km upstream for some decades.
- Fish were contaminated with mercury, making them unfit to eat.
- Tests showed that 70 to 80 per cent of the adults from the Grassy Narrows reserve showed some symptoms of Minimata disease.
- Symptoms Included blurred vision, disturbances in speech, twitching, shaking, poor reflexes and balance.

Local problems related to mercury

- Traditional food and harvesting was halted.
- Commercial fishing industry ended.
- Loss of self-esteem within the community of the Grassy Narrows people.
- Grassy Narrows received compensation in the 1980s from the Reed Paper Company and the Federal government.
- To date the pollution has never been cleaned up from the lake sediment and every spring turbulence causes mercury to be re-released.

Presently, Grassy Narrows is in a legal battle with the federal government and Abitibi-Consolidated

- The community's traditional land area is 4,000 sq. kilometres, the reserve is only 22 sq. km.
- Abitibi-Consolidated has been given permission to log the traditional land used by the Grassy Narrows people.
- The people of Grassy Narrows blocked a logging access road in protest.

Grassy Narrows vs. the federal government and Abitibi-Consolidated (cont.)

- They fear that clear-cutting of their traditional forest will threaten their way of life.
- The Grassy Narrows community believes it is legally entitled to their traditional land use of 4,000 sq. kilometres through the Royal Proclamation of 1763.
- The Royal Proclamation of 1763 was signed with Britain when it became the dominant power in Canada.

Conclusions

- Whatever the outcome may be regarding the Grassy Narrows people and Abitibi-Consolidated, **it is almost guaranteed that this will not be the last battle for the people of Grassy Narrows**.

- Are these circumstances unique to the Grassy Narrows people or part of a common struggle for native people across North America?

- The above highlight was accurate

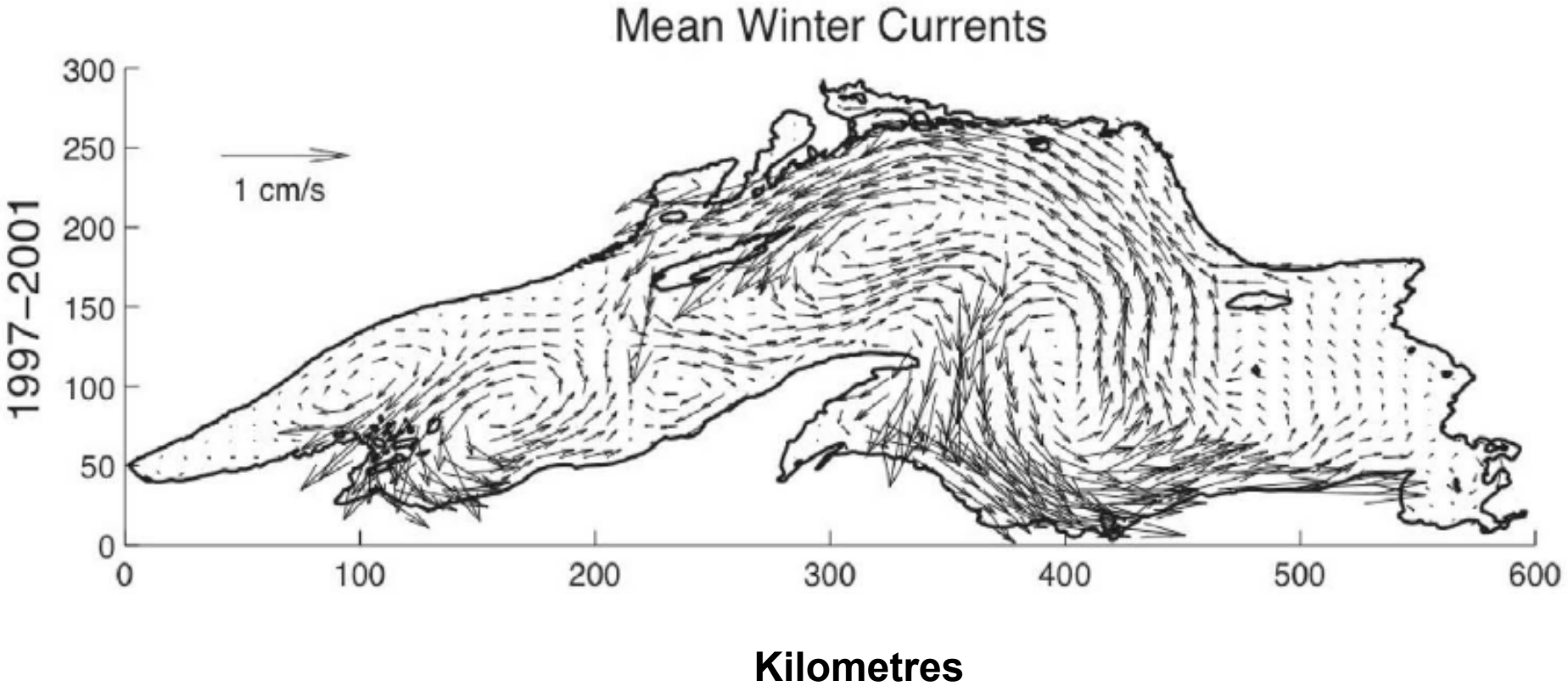
No safe level in First Nations' tap water

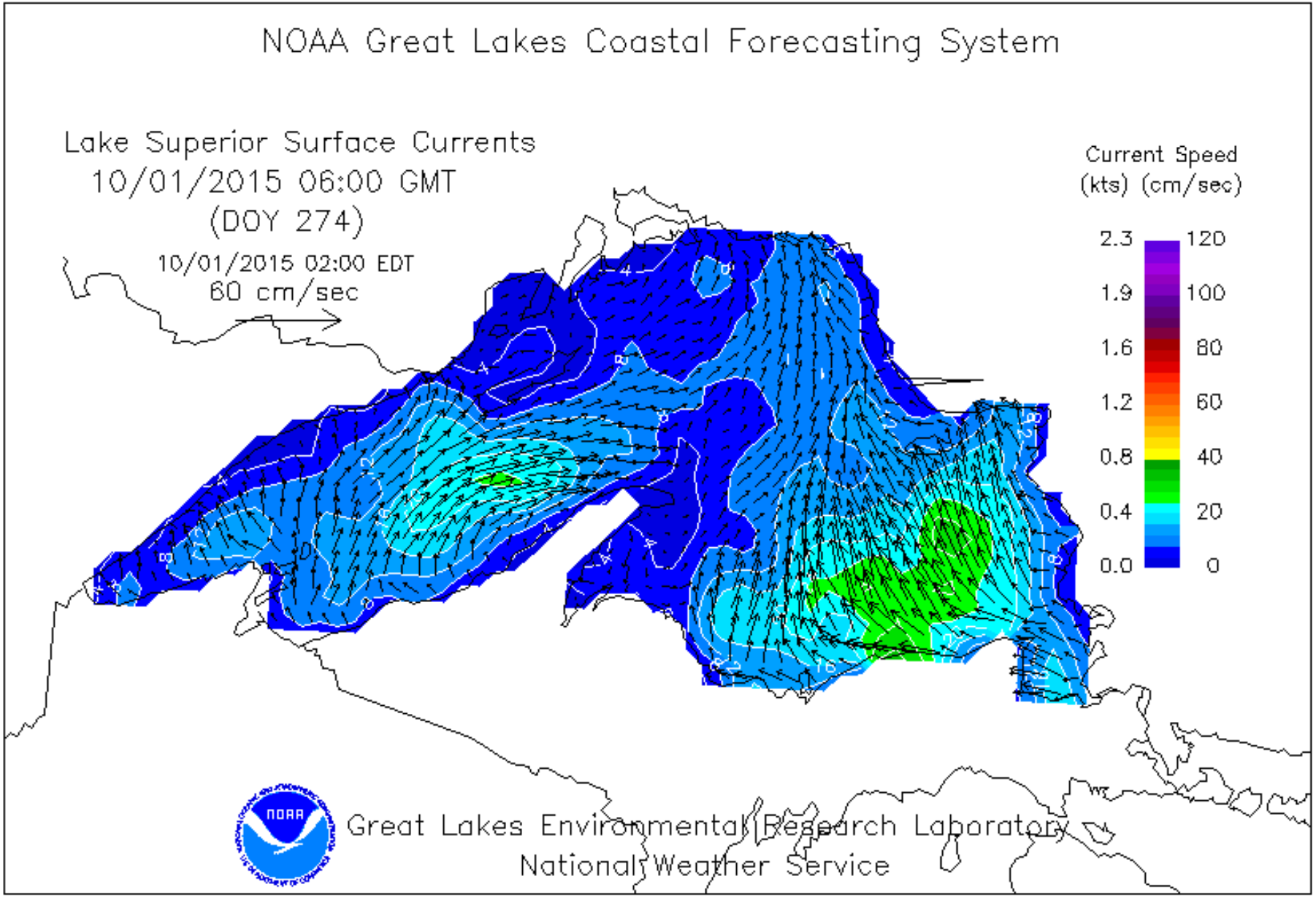
- State of emergency over bad water
- Turbidity in drinking water 120 times Ontario guidelines
- presence of potentially cancer-causing disinfectant by-products
- “No difference if you boil it”

Water advisories currently at 31 First Nations in Northern Ontario


X Grassy Narrows
X ELA
X Jackfish Bay
X Thunder Bay North Harbour
X Silver Bay

Lake Superior Water Circulation





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Mercury issues continued

Thunder Bay North Harbour

- Mouth of the Current River and inside the north part of the breakwall. The site is immediately adjacent to the former Provincial Papers mill
- Large volume of mercury-contaminated sediment resulting from nearly 90 years of operation as a pulp and paper manufacturing facility
- Approximately 22-hectare (Ha) of water area with an estimated 343,000 cubic metres (m3) of sediment impacted with organics and mercury located near the former mill effluent discharge location
- Lake bottom is made-up of organic-rich sediments consisting of the wood fibre, wood wastes, and elevated concentrations of mercury.

Mercury issues continued

- One of 43 Great Lakes Areas of Concern (AOCs).
- Development of a sediment management plan for this contamination is the most significant outstanding remedial action required under the Thunder Bay Remedial Action Plan (RAP).
- Two comparable Great Lakes sites
  - are Hamilton Harbour/Randle Reef (~25 Ha & 500,000 m3 sediment) and
  - Peninsula Harbour in Marathon (22 Ha).
- Mercury contamination levels in the Thunder bay North Harbour sediment range from 0.21-41 ug/g this is on the same level of magnitude as the Peninsula Harbour mercury levels. The organic sediment conditions are significantly different from Peninsula Harbour.

Terrace Bay Pulp and Paper Mill

Reserve Mining Company

47 tons of waste rock into Lake Superior every minute.

Silver Bay, Minnesota

- Processing plant machines crushed the rock - separated the useable iron from the waste rock.
- 1955 to 1980
- microscopic fibers similar to asbestos
- Stopped because of court ruling

Closure resulted in 3,000 people - suddenly out of work. The United States lost one-twelfth of its supply of iron ore.

The first time a court shut down a major industrial plant to protect the environment.

THE ONLY PLACE LIKE IT IN THE WORLD

- COMPLETE ECOSYSTEM RESEARCH
- 45 YEARS OF CLIMATIC AND OTHER RECORDS
- MINIMAL EXTERNAL HUMAN INFLUENCES

Experimental Lakes Area (ELA)

experimentallakesarea.ca

The ELA opened in 1968 - a living laboratory of 58 small lakes near Vermillion Bay, Ontario.

Acid Rain ***Algae blooms***

Mercury ***Health of fish***

Untreated sewage ***Climate change***

The lakes are relatively isolated from human habitation and industry.

Was scheduled for closure in 2013

Experimental Lakes Area (ELA) Mercury Research

Past Research on Impacts of hydro reservoir developments:
Studies of the impacts of hydro reservoir development on both greenhouse gas (GHG) emissions and mercury cycling. Key findings:

1) **that reservoirs produce GHGs through the decomposition of flooded soils and vegetation**
2) **flooding wetlands produced higher amounts of GHGs and mercury than upland areas.**

Manitoba Hydro and Hydro Quebec have used study findings to build reservoirs with lower environmental impacts.

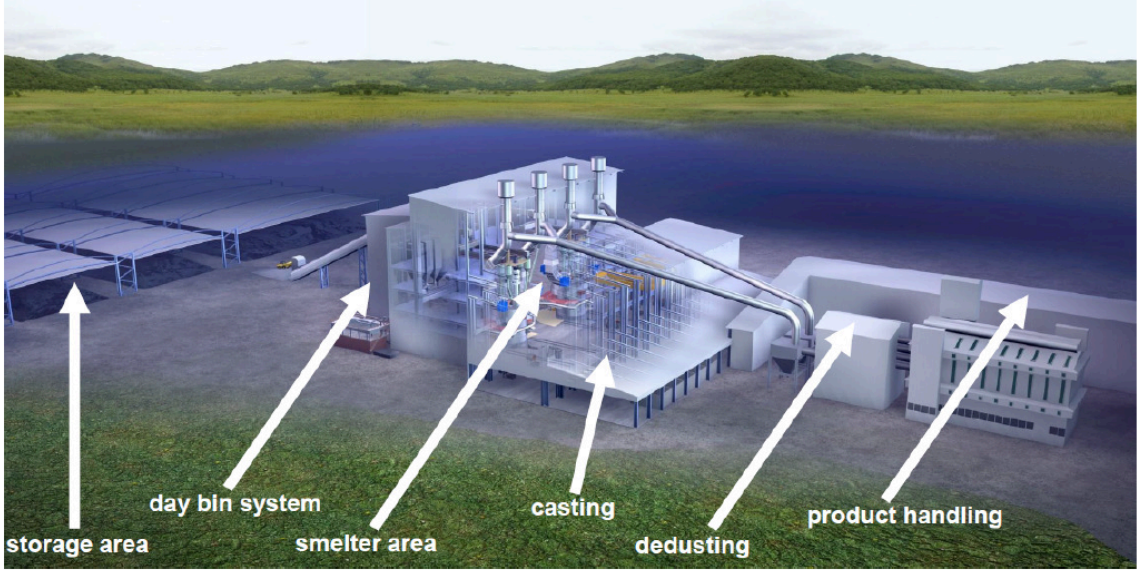
Current Research:
Atmospheric mercury: Influential experiment involved adding small amounts of mercury to a lake to mimic atmospheric mercury deposition from coal-fired power plants. Controlling such emissions leads to decreased mercury levels in fish. Findings provide support for regulations of the Environmental Protection Agency and Environment Canada to require power companies to add mercury scrubbers to their smoke stacks.

Proposal for Integrated Solar Complex

3D View
Quartzite – Metallurgical Grade Silicon

M+W GROUP

- Raw material
  - Quartzite with specific size and purity
  - Wood chips, Charcoal
- Metallurgical Grade Silicon
  - Purity 98%-99%
- Potential Partner: SMS Siemag



Picture: Courtesy SMS Siemag

Other potential Markets: **Steel Industry**

3D View
Integrated PV Manufacturing: Poly Si - Module

M+W GROUP

2GW Co-Gen Power Plant

- Base Load Required for manufacturing
- 500 MW required for Manufacturing
- 1.5 GW for national grid


We’re
up to it!