

Environmental Impacts of Mining

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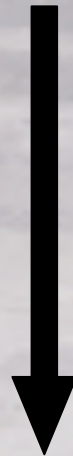
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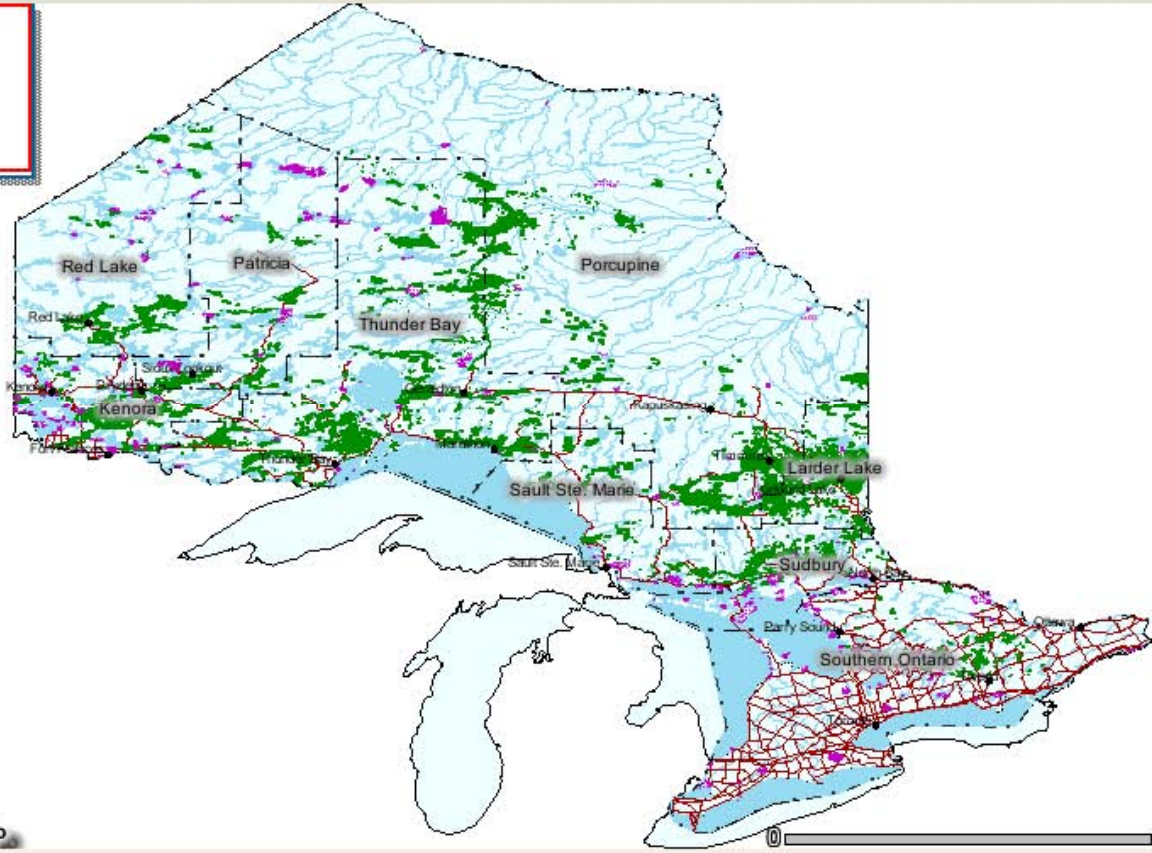
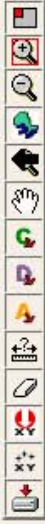
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The Mining Sequence

- Land Use Planning
- Claim Staking
- Exploration
- Feasibility
- Environmental Assessment
- Development
- Operation
- Closure and reclamation

Consultation and Consent

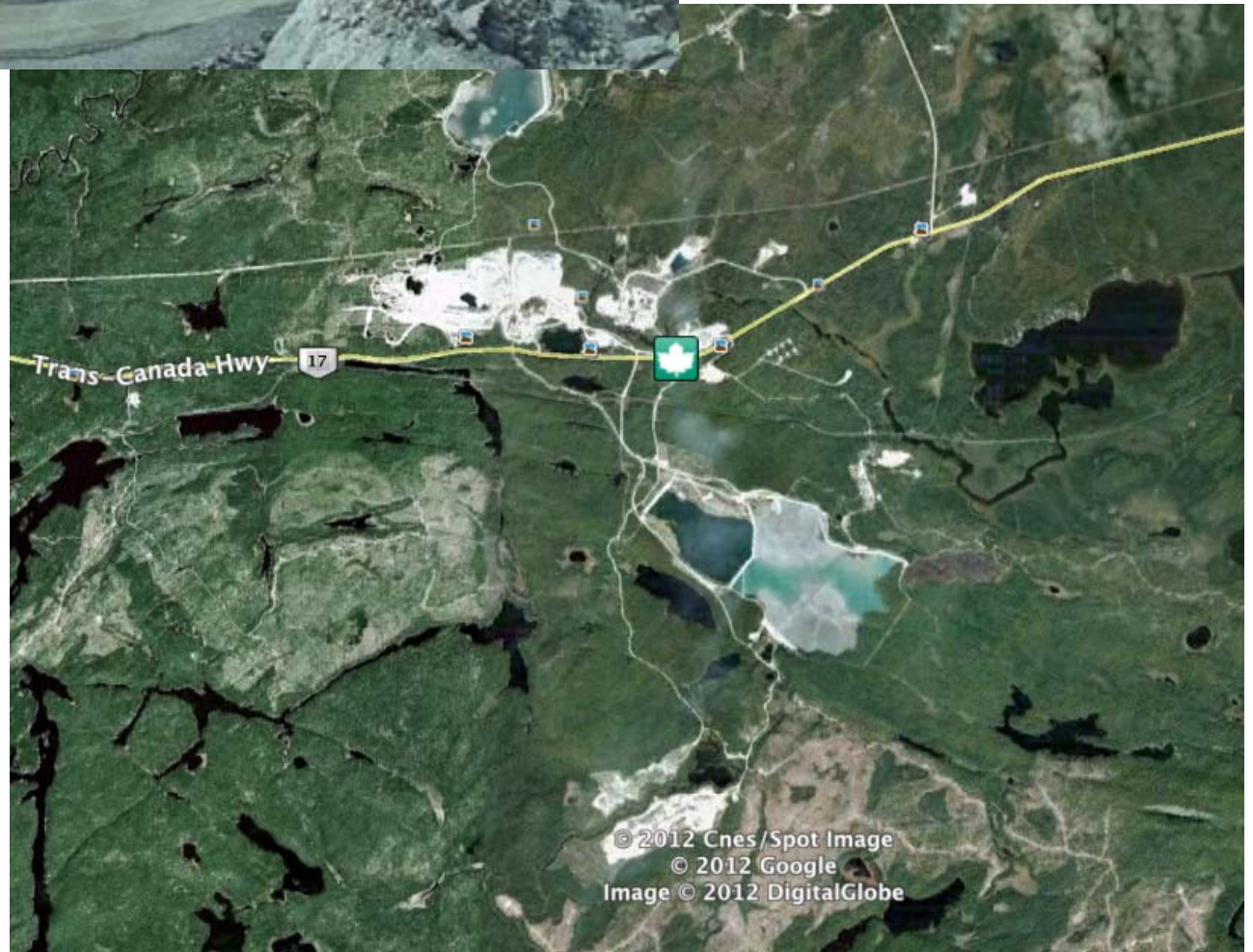




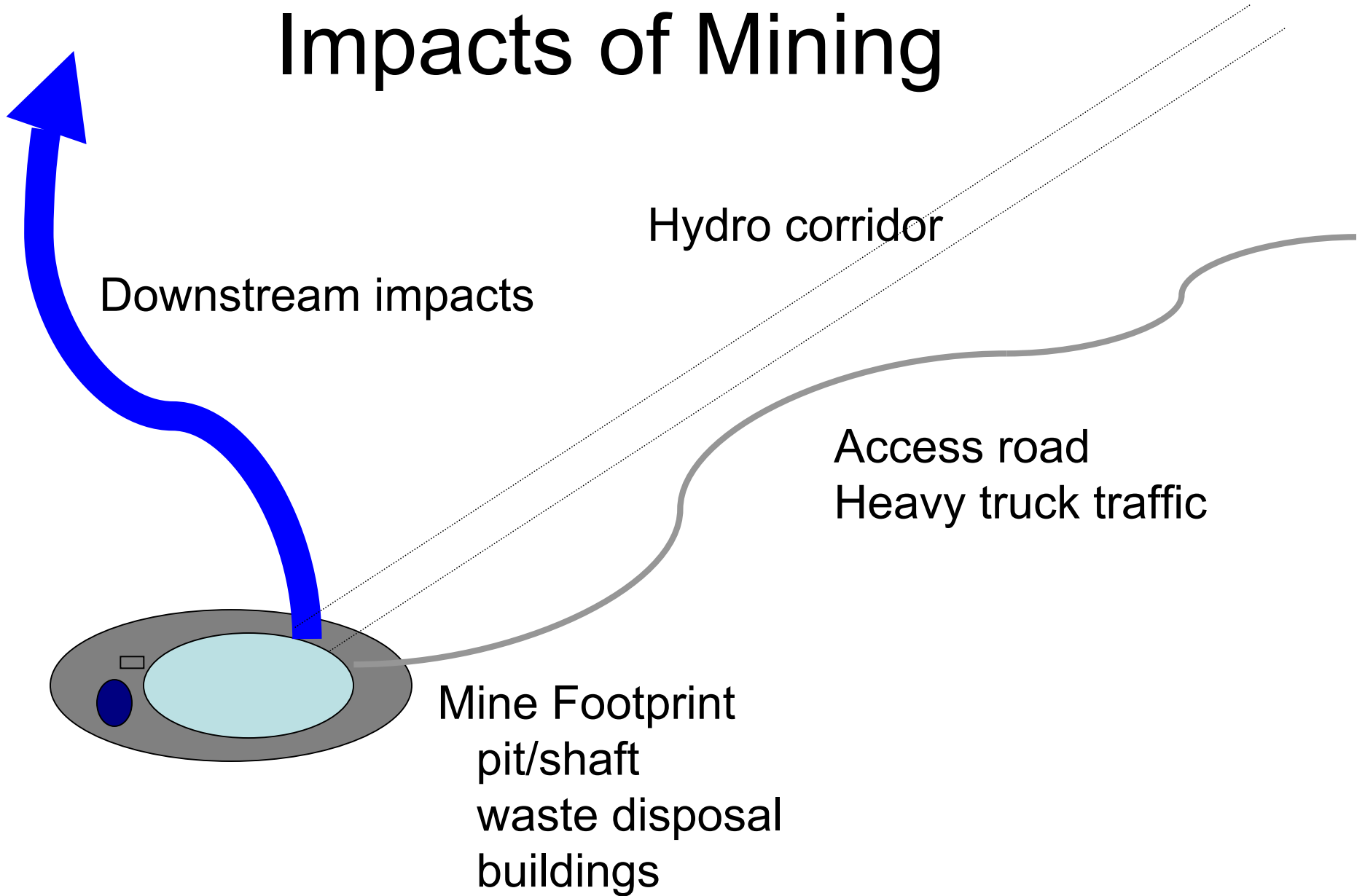




Williams Mine



Impacts of Mining

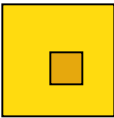


Mine Shadow





Ore



Concentrate with mineral (2% of ore)



Smelter

Waste Rock Pile



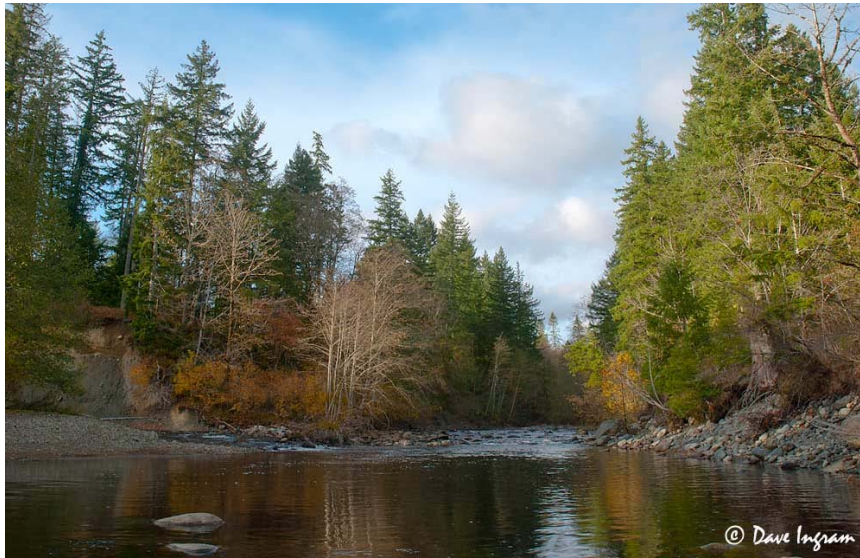
Tailings Impoundment



Water Quality – Acid Mine Drainage



Tsolum River - British Columbia





CHROMITE



Chromium

- 2 forms Chromium 3 and 6
- Both toxic but our bodies don't let 3 into our cells, 6 easily passes through.
- Chromium 6 occurs from grinding, smelting chromite and is used in industry.
- Toxic effects of Chromium 6: reproductive problems, cancer, skin damage.....

Metals and Fish

- Acutely toxic at higher concentrations
- Very low concentrations have chronic effects (micro grams per liter)
 - Affect sense of smell
 - Affect reproduction
 - Affect vital organs
 - Carcinogenic
 - Bio-accumulate



WHAT'S A MICRO GRAM ?

Dived 1 sugar cube in 4

Divide again into 1000

Divide one of those parts into 1000, one of those parts =

1 microgram

Waste Management



Hydrology – Water Management



Metal Mining Effluent Regulations

Exceedances of Limits Prescribed in Schedule 4

Substance / Parameter	Number of Exceedances	Number of Facilities
Arsenic	1	1
Copper	1	1
Cyanide	–	–
Lead	–	–
Nickel	9	4
Zinc	3	3
TSS	57	16
Radium 226	2	1
pH	6	5
Total	79	31

Jurisdiction	Rainbow Trout Acute Lethality Tests			<i>Daphnia magna</i> Monitoring Tests		
	Total Number of Tests	>50% Mortality		Total Number of Tests	>50% Mortality	
		Number of Tests	Number of Facilities		Number of Tests	Number of Facilities
British Columbia	92	2	1	92	5	2
Yukon	36	–	–	36	1	1
Saskatchewan	40	–	–	41	2	2
Manitoba	61	–	–	61	20	5
Northwest Territories	5	–	–	5	2	1
Nunavut	12	–	–	12	1	1
Ontario	242	13	2	239	1	1
Quebec	249	–	–	248	4	2
New Brunswick	16	2	1	16	1	1
Newfoundland and Labrador	147	8	3	147	46	2
Nova Scotia	11	–	–	11	–	–
Total	911	25	7	908	83	18



Environmental Effects Monitoring

- “On average” mines in Canada have impact on downstream aquatic communities.
 - Decreased weight in fish
 - Decreased liver size in fish
 - Less diverse prey
(benthic invertebrates)



Provincial Records 2010

- 11 mines exceeded provincial permits (that's about 1/3)
- McWatters Mine (Liberty) had 22 failed effluent tests
- Timmins Mine (Lakeshore Gold) had 20 failed effluent tests

An aerial photograph showing a wide, muddy river with a brownish-grey hue, likely due to sediment discharge. The river flows through a landscape with patches of snow and dense evergreen forests. The river's path is somewhat irregular, winding through the terrain.

What about Cliffs?

5 spills in 18 months at Lac Bloom Iron Mine

In 2010 environmental groups sued for contamination from tailings ponds in Minnesota

Illegal tailings discharge and problems with selenium contamination in Michigan

Corporate Social Responsibility

vs.

Deny

Delay

Do “good”

Mine Closure

- Ontario requires a plan before mining starts
- Have to post financial security (How much?)
- What about long-term care of a site? Who is responsible, who pays?

Whistle Mine



Options for dealing with mines

- Keep out of most sensitive areas.
 - Eg. KI.
- Develop your own capacity to review and direct mining projects where they may be acceptable.
 - Eg. Akwesasne Environment Department
- Insist on creation of independent oversight organizations that have their own authority, funding, transparency and reporting mechanisms.
 - Eg. Ekati Diamond Mine (NWT)