



YANKEE GIRL TAILINGS

A Perspective on Risk Assessment:

- Regulation/Objective Setting
- Technical
- Community

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SNC•LAVALIN
Morrow Environmental

NOAMI Case Study Presentation – Part 2

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REGULATORY DRIVERS



Fisheries
and Oceans

INSPECTOR'S DIRECTION *Pursuant to Section 38(6) of the Fisheries Act*

RECEIVED FEB 07 2005

1. A study (Detailed Site Investigation) is to be conducted
4. The acceptable remediation option will be completed by December 31, 2005.

Environmental Management Act

CONTAMINATED SITES REGULATION



11 **TECHNICAL GUIDANCE** **ON CONTAMINATED SITES**

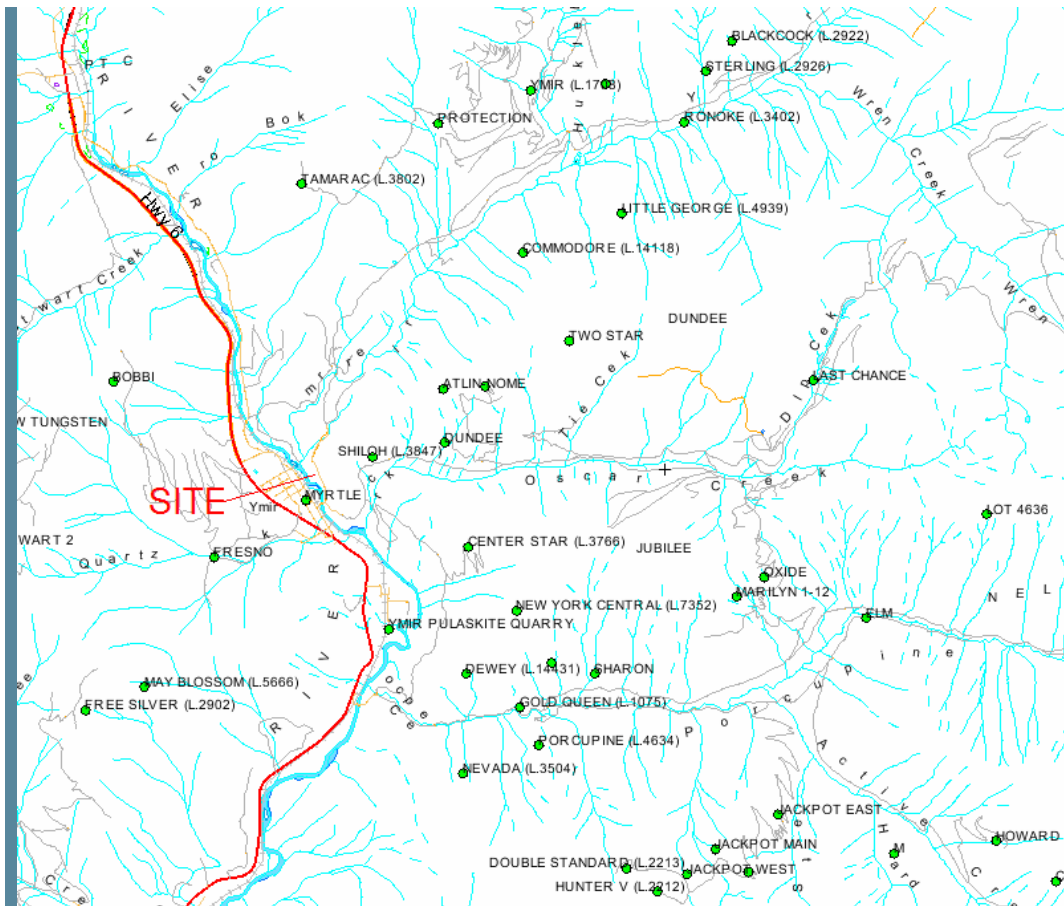
Checklist for Reviewing a Detailed Site Investigation

June 2005

"risk assessment" means the systematic process of identifying and evaluating substances, persons potentially affected, and exposures to the substances in order to estimate cancer risks or hazard indices in accordance with a director's protocol;

Challenge: Beware a (unnecessary) regulation-oriented process that stifles a risk-based, multi-stakeholder objective setting exercise at the outset.

WATERSHED OBJECTIVES AND CUMULATIVE EFFECTS



USEPA Waste Load Allocation (WLA): On a larger scale, or system wide context, care must be taken that water quality conditions that protect designated beneficial uses are achieved - A benefit of a technically sound WLA is that excessive degrees of treatment which are neither necessary nor productive of corresponding improvements in water quality for the whole water body, or at least major sections thereof, can be avoided¹.

In Europe, the Water Framework Directive (WFD) has placed emphasis on addressing water pollution from a catchment management perspective.²

¹ [Technical Guidance Manual for Performing Waste Load Allocations](#), United States Environmental Protection Agency

² [The importance of point and diffuse pollution in developing management strategies for long-abandoned metal mines in the UK](#), Adam P Jarvis, Institute for Research on Environment and Sustainability.

Issue: Can a catchment management perspective be incorporated within Canada's regulations?



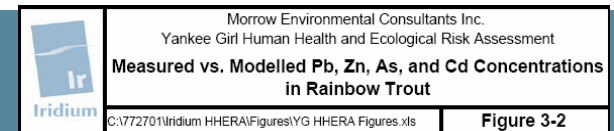
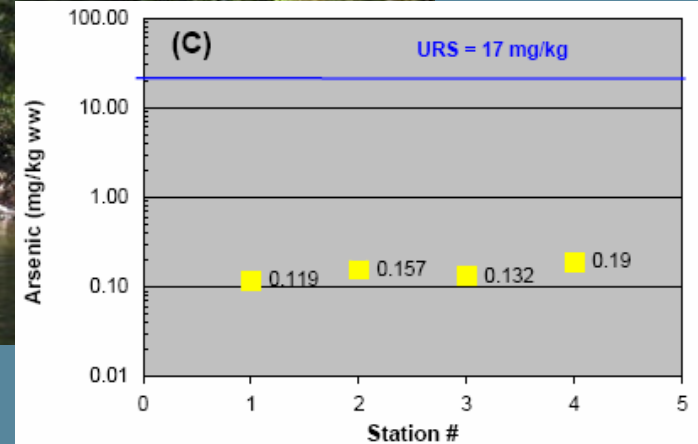
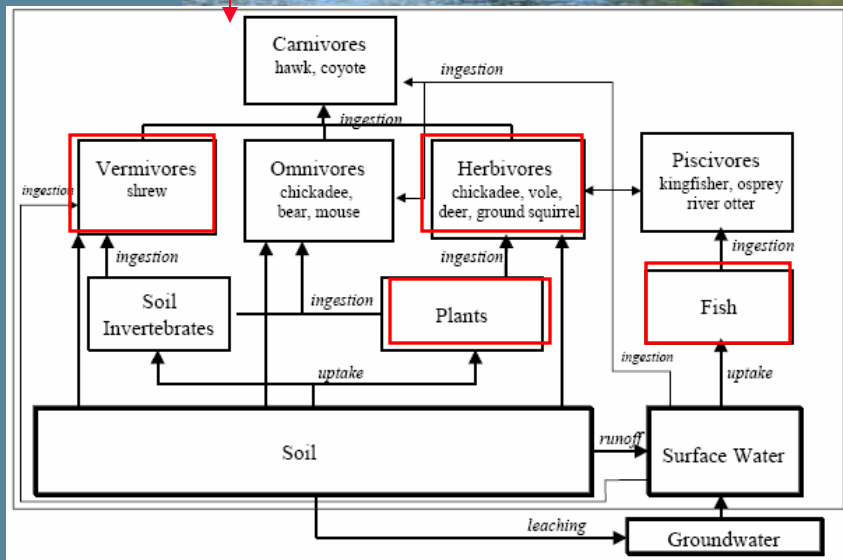
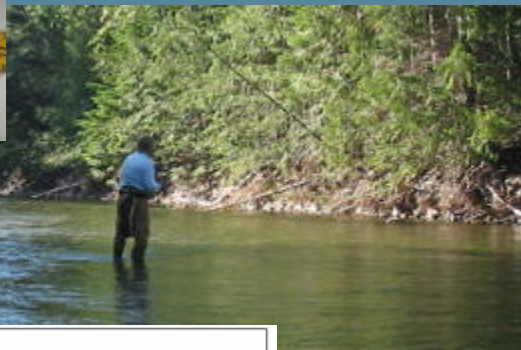
New HHRA exposure pathway?



TISSUE SAMPLING HIGH UP THE FOOD CHAIN FOR RISK ASSESSMENT



Tissue analysis



“Mark met with me with reports...and addressed my questions... I am most appreciative of the time Mark spent and the level of detail he was able to explain.”

Success: The use of tissue sampling provided more certainty in the risk assessment, and appeared more defensible to stakeholders.

THE RISK OF REMEDIATION? (GLOBAL THINKING)



Construction Work is risky:

~10 fatal accidents per 100,000 workers per year¹ =
~1 fatality per 2 million worker hours.

12,000 estimated construction worker hours for
project to date.

= ~1 in 166 risk of fatality from construction work.

¹European Agency for Safety and Health at Work.

Calculated Human Health Risk (Pre-Remediation)

- 1 in 43,000 Incremental Lifetime Cancer Risk for arsenic
(BC standard is 1 in 100,000)
- Hazard Quotient of 2.2 for lead
(BC standard is 1)

**Return on Investment:
~36 years**

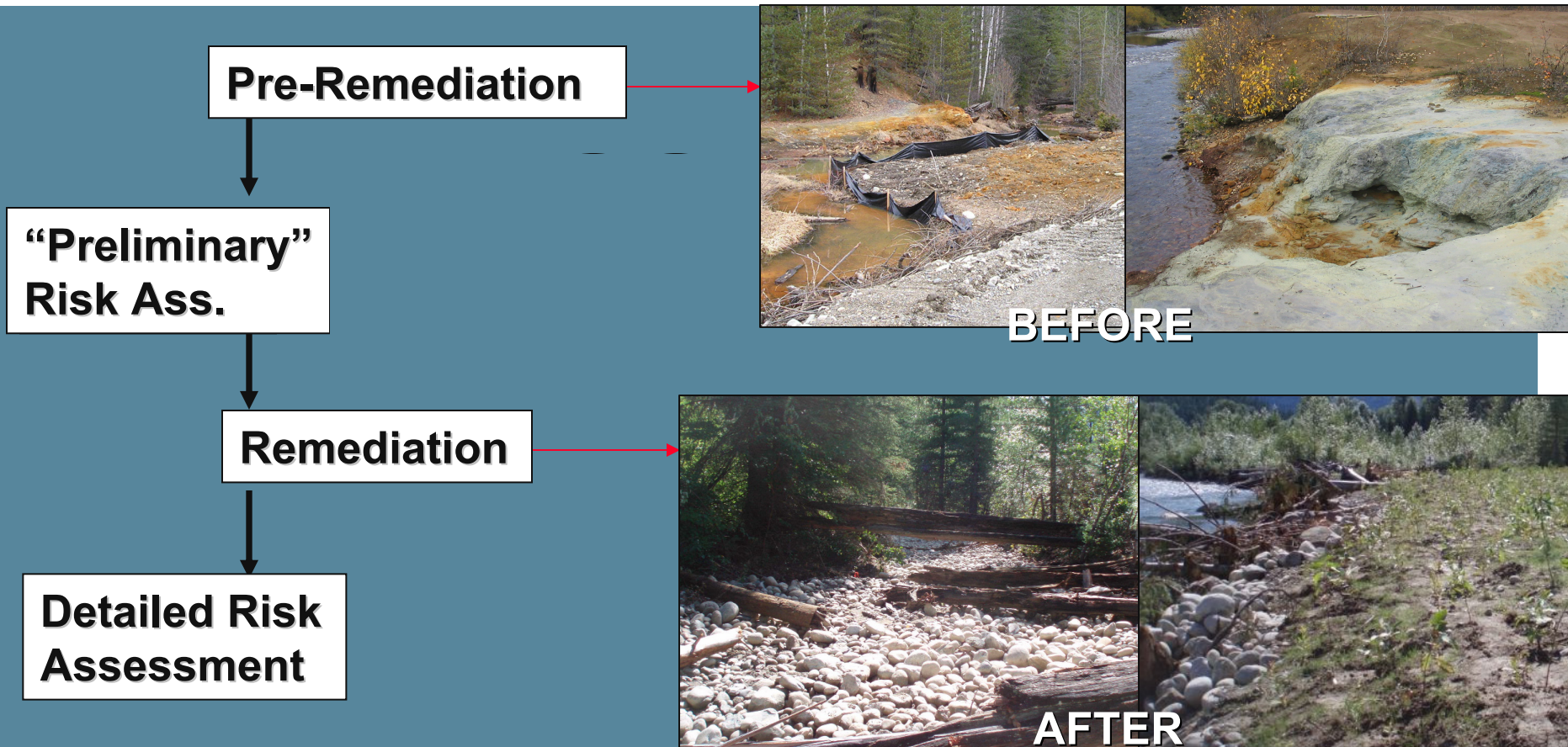
“How long would it take for the site to be
‘cleaned up’ by natural processes
anyway?”

~ 250 years

**Issue: What if the risk of carrying out the remediation exceeds
the pre-remediation risks?**



POST-REMEDIATION SCENARIO



Lesson: Consider the post-remediation scenario in Risk Assessment

DIVERSE COMMUNITY PERCEPTIONS

1) Do nothing!

“When we were children we would make a slide in the clay [tailings] and slide into the river – it took a while to to get the clay stains out of our clothes and skin.....we are all very healthy”

“For the amount of money spent on this site ... couldn't you have just as well put up signs about the health risks?”

“How long would it take for the site to be cleaned up by natural processes, anyway?”

“Why contain? Leave the land to rot in its own juice – beautiful”

“What started as a ‘skim more grant money’ for the Streamkeepers has ballooned into a boondoggle. Wasted money, time and machinery....”

“I am going to put a sign up that says ‘Milking the taxpayer’ and if anyone takes it down I will find you and punch you out and put a sign on your face “



DIVERSE COMMUNITY PERCEPTIONS

cont'd



DIVERSE COMMUNITY PERCEPTIONS

2) Do everything!

“My concern is of course my drinking water but also local wildlife on the river, specifically ducks and the dipper...I'm concerned that it could be poisoned.”

“We don't want to live with the fear of contaminants affecting our young ones and their future children”

“Hasn't this community born the risk of having these toxins long enough, now can't we just get rid of them permanently?”

“...consider moving and treating the material offsite to an appropriate location.”

“Storing these toxic tailings beneath our feet is intuitively questionable and risky...”

“...wondering if the remedial measures proposed will actually improve things.”

“The safest option for our community and our environment is to move them to a secure dry [off-site] containment location”



DIVERSE COMMUNITY PERCEPTIONS

3) Ok, good work!

“I appreciated the town meetings and the planning that went into them, it is good to have a way to be informed...”

“Awesome job! and thanks for the updates, I am passing them around”

“Thanks for the Newsletter, it looks great! I'm sure it will go a long way to answering community questions. I'm happy thru time that MAL CCSB has been able to provide many solutions for the concerns/suggestions outlined by community.”

“I really appreciated your offer to explain things to me”

“Thank you for this opportunity to contribute to this project”

“I have to say the site looks great... you guys have really done a great job to make sure it has a good feel to it by adding the rocks and trees. I'm looking forward to seeing and using the completed site.”

“...many people in Ymir are very impressed and happy with the work that has been done at the Yankee Girl site. Some were skeptical of the entire project, but have since changed their mind after they have seen the finalized product.”

Success: Feedback received indicates the majority of the community were ultimately comfortable with the risk management plan and how it was communicated to them.

Lesson: Community consultation requires time and effort. It is not possible to satisfy all community members where there is extreme diversity of opinion.

THANK YOU!

