Green and Sustainable Remediation: Beyond Traditional Cleanups

Tom Coogan & Jennifer Borski,
WDNR

Brownfields

Abandoned Drums

Site in Jefferson, WI

Why are Brownfields an Issue?

- Contribute to neighborhood deterioration & decreased values
- Often serve as barriers to economic growth in older neighborhoods
- Pose environmental and public health threats
- Attract vandals and open dumping
- Disproportionally affect low-income and minority neighborhoods

Benefits of Redeveloping Brownfields

Solar pump (Kewaunee Marsh)

- Encourage smart land use and green space conservation
- Add to tax base and spur economic development
- Revitalize neighborhoods
- Opportunities for community buy-in

Benefits of Sustainable Cleanups

CITY OF Eau Claire

MOTOR HARLEY-DAVIDSON CYCLES

MONONA

KOHL'S
expect **great** things

BAYFIELD
and the apostle islands
where the water meets the soul.

Epic

MENASHA

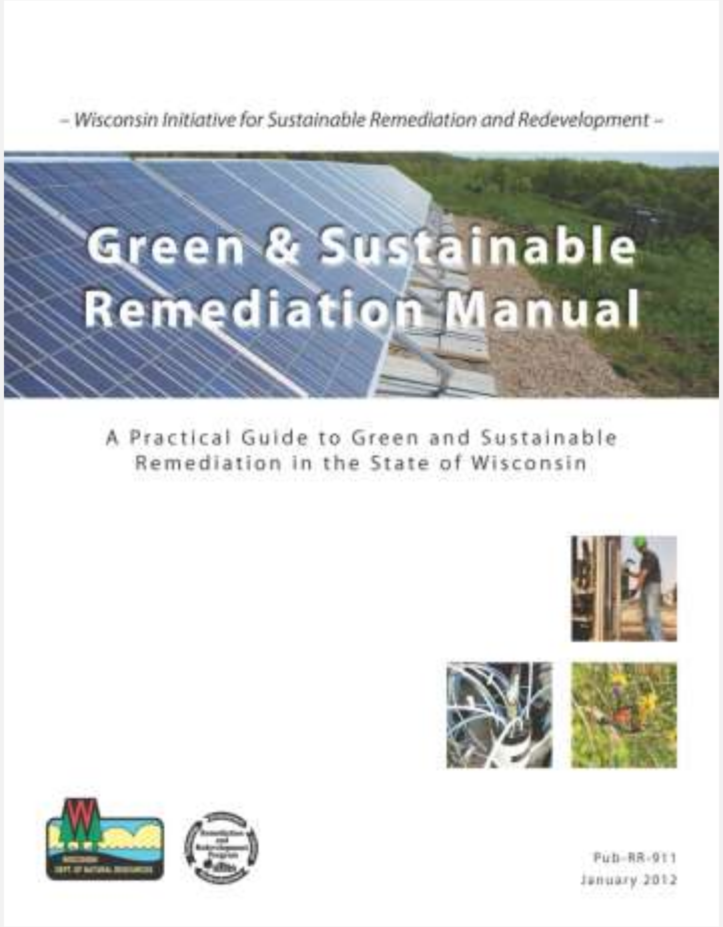
Wisconsin Initiative for Sustainable Remediation & Redevelopment

- DNR Remediation and Redevelopment Team
- Promote Environmentally & Socioeconomically responsible practices

Central Office	Regional Project Managers
• Tom Coogan, Team Leader • Chris Zenchenko, IT • Judy Fassbender, Technical Section Chief	• Jennifer Borski, NER • Mark Drews, SER • Erin Endsley, NOR • Gina Keenan, WCR • Larry Lester, SCR

Resources

- Main Reference Document
- Guide staff and Responsible Party (RP) thought process
- Consultant/RP – sustainable ideas
- Community – help with planning for Brownfield sites



Inside the GSR Manual

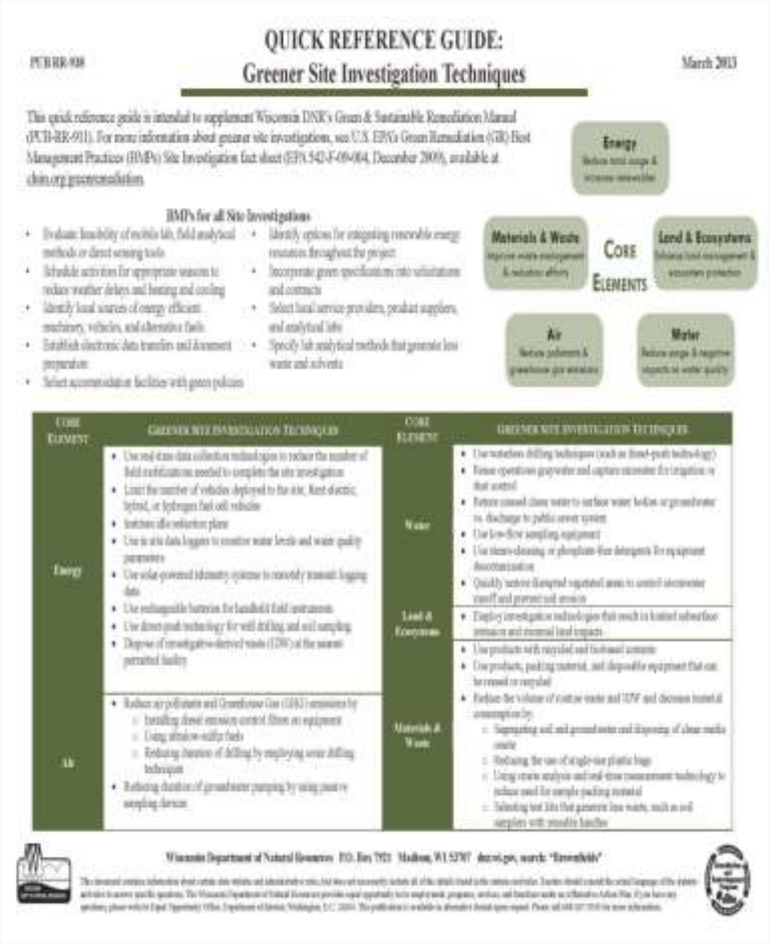
- GSR Overview
- Integrating GSR into all Phases of the Project Life Cycle
- Sustainability Baseline Development
- Remedial Process Optimization
- Alternative Energy
- Sustainability Options Evaluation
- Appendix A – Example Qualitative Checklist and Carbon Footprint Calculations
- Appendix B – Life Cycle Cost Analysis

Quick Reference Guides

QUICK REFERENCE GUIDE:

Greener Remediation Optimization Techniques

March 2013



QUICK REFERENCE GUIDE:

Greener Site Investigation Techniques

March 2013

Site Specific Analyses


Wisconsin Initiative for
Sustainable Remediation
and Redevelopment
- WISRR -

January 2012

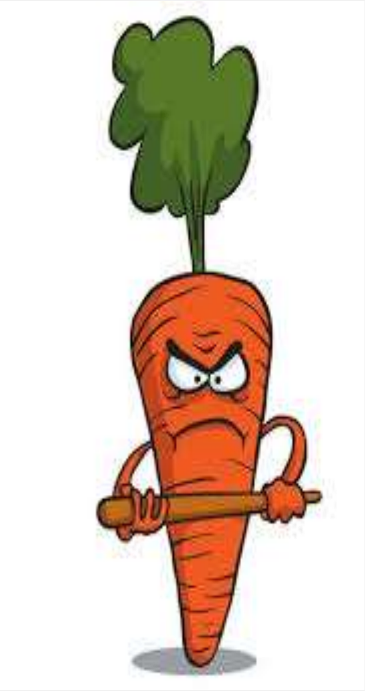
Site Specific Sustainability Analyses

Site Specific
Sustainability Analysis

Wisconsin Department
of Natural Resources

- Detailed Analysis of GSR potential:
  - N.W. Mauthe, Appleton, WI
  - Delafield Landfill, Delafield, WI
  - Refuse Hideaway, Middleton, WI
  - Penta Wood, Siren, WI

Evaluation of GSR Principles



Photos courtesy of Google

WI Cleanup Rules (NR 722)

Upon selection of the Remedial Action, RP must address the following criteria:

1. **Energy Use**
2. **Generation of Air Pollution**
3. **Water Use**
4. **Future Land Use**
5. **Materials and waste**
6. **Long Term Sustainable Management**

We're Not Alone

- American Society for Testing and Materials (ASTM) Greener Cleanups Standard
- Environmental Protection Agency
  - http://www.clu-in.org/remediation/
- Neighboring States
  - IL: Matrix for selection of sustainable practices
  - MN: Greener Practices Toolkit

What GSR Can Look Like

American Quality Fibers, Menasha (before and after remediation)

Traditional Cleanup vs. GSR

Traditional Cleanup:

- Focus on the property
- Excavation
- Groundwater pump & treat

Excavation - Photo by J. Borski, WDNR, Sept 2010

Traditional Cleanup vs. GSR

Green & Sustainable Remediation (GSR):

- Environmental (energy, water, waste, air & land)

- Economic (life cycle cost)
- Social (community impact - considers end land use)

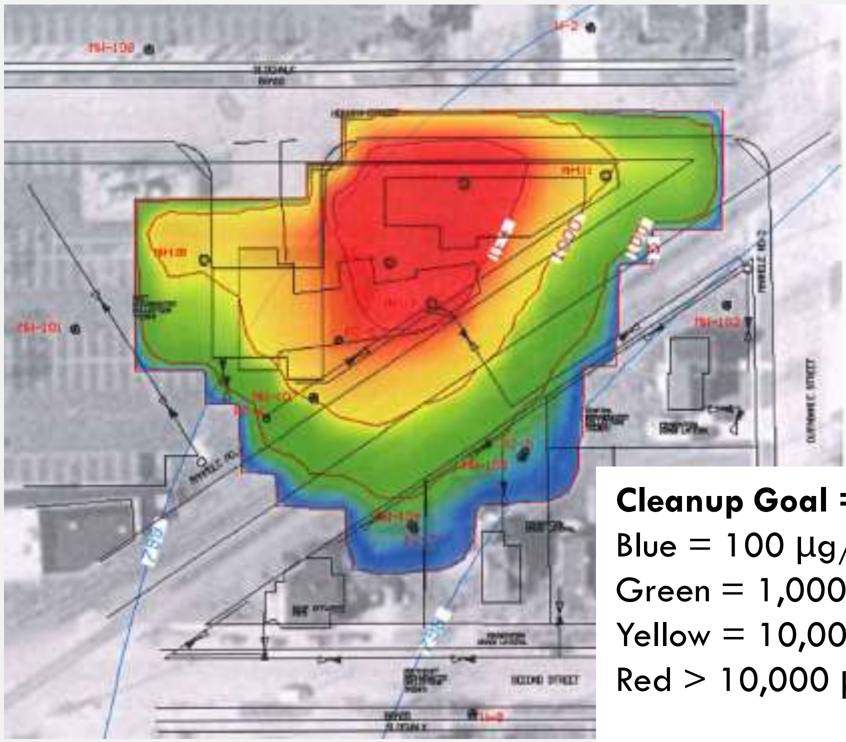
N. W. Mauthe Superfund Site

Figure by OMNNI Associates, *Operation & Maintenance Report*, October 2011

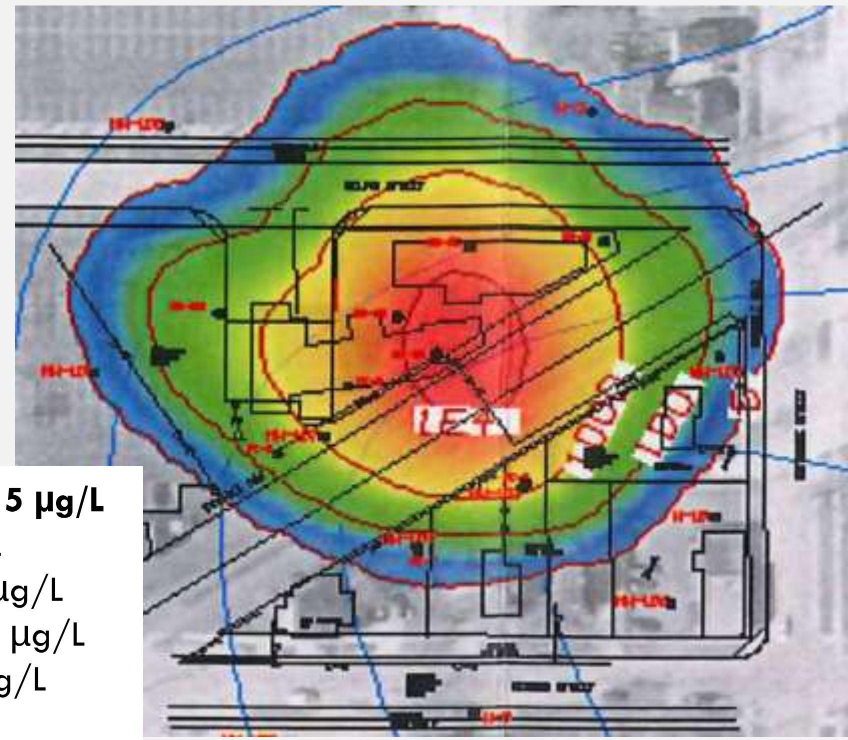
N. W. Mauthe Superfund Site

Chromium plume in groundwater

2007 extent



Estimated extent in 500 years



Cleanup Goal = 5 µg/L
Blue = 100 µg/L
Green = 1,000 µg/L
Yellow = 10,000 µg/L
Red > 10,000 µg/L

Figures by OMNNI Associates, *Simulation of Solute Movement*, March 2007

N. W. Mauthe Superfund Site

N. W. Mauthe Treatment Building - Photo by J. Borski, WDNR, Nov 2005

N. W. Mauthe Superfund Site

N. W. Mauthe Treatment Building - Photos by OMNNI Associates, 2010

N. W. Mauthe Superfund Site

Yearly Operating Cost								
	Lamp type	Average hours/day operation	Electrical charge ($/kwhr)	Yearly operating cost/lamp	Number of lamps	Yearly operating cost	Yearly operating savings/ fixture	Years to payoff initial investment of both fixtures
20	W LED	12	$0.126110	$11.05	2	$22.09	$71.81	2.60
150	W Metal Halide Lamp	12	$0.126110	$82.85	2	$165.71	$0.00	

Maintenance and Operating Cost over 50,000 hours* of operation (Two Fixtures)								
	Lamp type	Fixture installation cost	Relampling cost initial	Relampling cost	Labor cost	Operating cost	Cost of ownership	
20	W LED	$610	$0	$0	$0	$252.22	$862	
150	W Metal Halide Lamp	$0	$237	$50	$95	$1,891.65	$2,274	

*50,000 hours @12 hours/day = 11.4 years

Years to payoff initial investment of both fixtures:
($610-$237)/($165.71-$22.09) = 2.39 years

Table by OMNNI Associates, 2010

N. W. Mauthe Superfund Site

N. W. Mauthe Pumps at Manhole No. 2 - Photos by J. Borski, WDNR, Oct 2012

Refuse Hideaway Landfill, Middleton

Photo by WDNR

- Superfund site that DNR now manages
- Redevelopment not likely
- DNR Pilot Project under WISRR
- Showcases renewable energy

For More Information

- **WISRR Homepage**
  - **dnr.wi.gov/topic/brownfields/rrprogram.html**
- **EPA Webpage**
  - **EPA: www.clu-in.org/greenremediation**
  - **http://www.epa.gov/oswercpa/**
- **Questions**
  - Tom Coogan, 608/267-7560 or Thomas.Coogan@wi.gov
  - Jennifer Borski, 920/424-7887 or Jennifer.Borski@wi.gov