

Consideration of Risk Perception as a Sustainable Remediation Best Practice



MONTCLAIR STATE
UNIVERSITY

Case Study on Lead-Impacted Residences

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**CDM
Smith**

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Overview

- Why Is This Important?
- Understanding Risk Perception
- Lead Exposure Prevention Case Study
- Other Applications

Why Is This Important?

Consideration of **risk perception** promotes **meaningful stakeholder engagement** and **sustainable decision-making**, throughout the remediation project **life cycle**



Meaningful Stakeholder Engagement:

- Meaningful public participation:
 - ‘all of the essential components of participation, from information sharing to education, including the active and critical exchange of ideas among proponents, regulators, and participants (Sinclair & Diduck, 2009, p.59).
- Should be a continuous process throughout remediation projects (Cundy et al., 2013).





Role of Risk Perception

Definitions

- Risk: relationship between the probability of harm associated with an activity and vulnerability of exposed elements
(Slovic 1987, 2003; UN-ISDR, 2002)
- Risk perception: “people’s beliefs, attitudes, judgements and feelings, as well as the wider cultural and social dispositions they adopt toward hazards and their benefits”
(Royal Society, Pidgeon et al., 1992, p. 89)

Risk Perception

- Influenced by a wide array of factors
 - knowledge, vulnerability, capability to respond to hazards, and demographics
- Severity of risk varies among individuals
- Affects stakeholder attitudes towards risk management
 - Hazardous waste management
 - Remediation and regeneration of land
 - Precautionary and mitigation efforts





Case Study

Jersey City DOH Lead Prevention Initiative

<http://www.cityofjerseycity.com/hhs.aspx?id=1446>



The major source of lead exposure among U.S. children is lead-based paint and lead-contaminated dust; which should be professionally removed.



Childhood Lead Poisoning Prevention Program (CLPPP)

199 Summit Avenue
Suite G
Jersey City, NJ 07304
Tel: (201) 522-4395
Fax: (201) 309-4873

Katiana Scalione, Coordinator

Description

This program provides a number of services to prevent lead poisoning:

- Lead screening for children 9 months thru 6 years who are uninsured or underinsured
- Case management by a Senior Public Health Nurse for children who are lead poisoned
- Environmental interventions by a certified lead inspector/risk assessor for children who have been determined to be lead poisoned
- Provide education and awareness on lead risks and hazards to the general public, day care centers, community agencies and anyone requesting information on lead hazards



All children ages 9 months through 6 years should be screened for lead exposure.

Jersey City, Hudson County, NJ

- NJ's 2nd populous city
- City has 2nd highest percentage of new elevated blood lead level cases (2014)
- Lowest abatement completion rate among top 5 polluted counties
- 70% of housing units built prior to 1978




Source: New Jersey Department of Health. 2014. Childhood lead poisoning in New Jersey, Annual Report for State Fiscal Year 2014.

Study Questions






- *Do Jersey City residents perceive themselves at risk from lead exposure?*
- *Are residents participating in mitigation and prevention activities?*
- *What factors are influencing their behavior?*

Study Site

Legend

-  Case Study Sites
-  NJDEP Historic Fill Material Areas
-  NJDEP Known Contaminated Sites

Percent Distribution Survey Respondents

-  1.27% *Other, Neighborhood 27.97%
-  7.20%
-  14.41%
-  16.95%
-  32.20%



Sampling Approach



Investigating Risk Perception of Lead Contamination in Jersey City, New Jersey

The purpose of this study is to determine if occupants are aware of lead contamination in soil and paint that may be present at their place of residence. If so, identify actions being taken by the occupant to address the contamination. This information will be useful in identifying potential sources of lead contamination in the area. Please complete this survey at your convenience and drop it in any mailbox; return postage is provided.

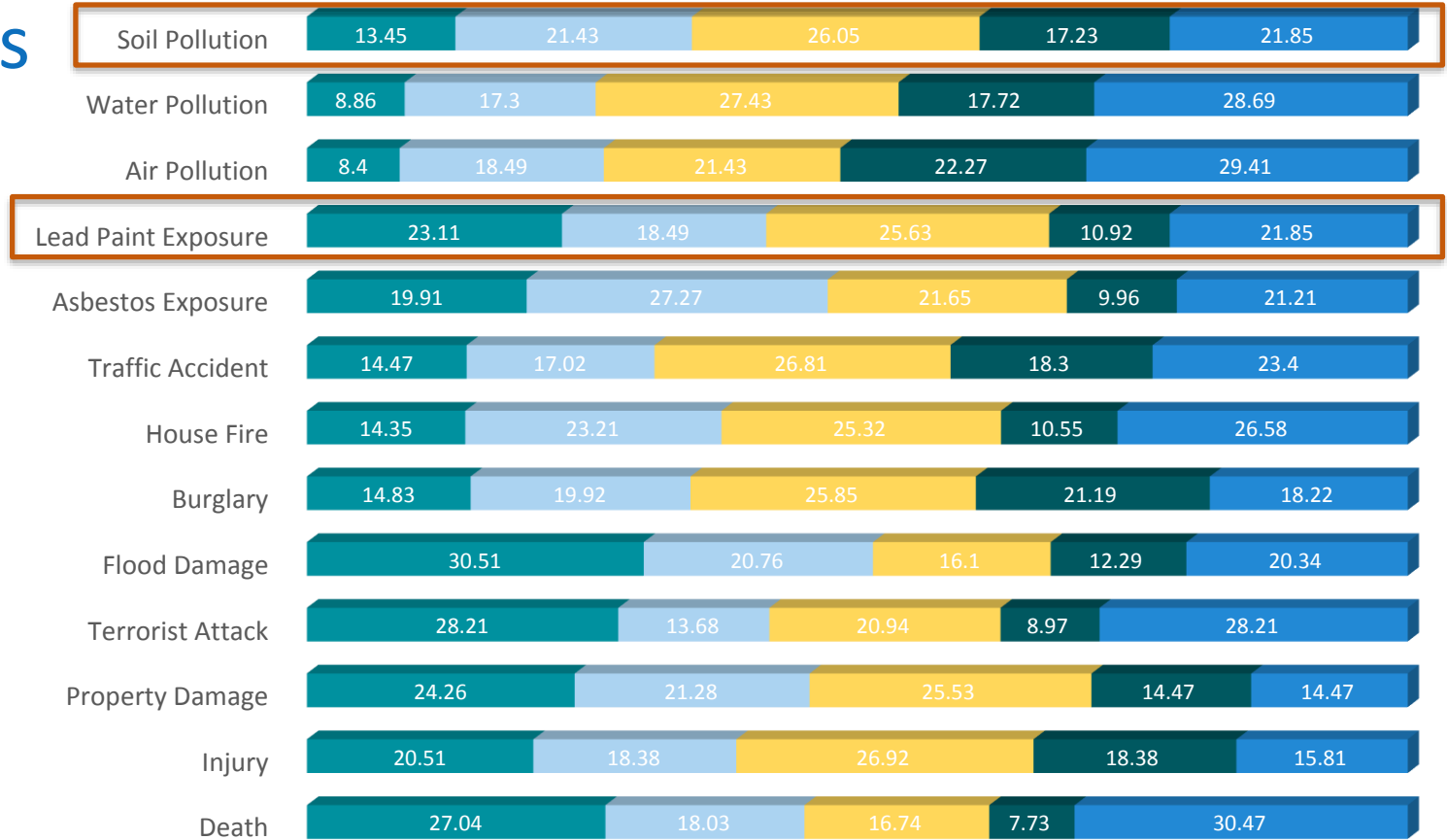


Risk Analysis

1. How serious of a risk does the following pose to <u>you</u> ? (please check one box for each item).	Not at All Risky	Moderately Weak Risk	Moderately Risky	Moderately Strong Risk	Extremely Risky
Death	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Property Damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Terrorist Attack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood Damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burglary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
House Fire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Accident	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Asbestos Exposure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Paint Exposure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water Pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil Pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Risk Analysis

■ Not at All Risky
 ■ Moderately Weak Risk
 ■ Moderately Risky
 ■ Moderately Strong Risk
 ■ Extremely Risky



Survey Questions: Risk Perception Factors

- Respondents were asked to rate their....
 - Ability to address hazards (e.g., crime, pollution, flooding)
 - Interest in learning more about hazards
 - Access to information on hazards
 - Responsibility to be aware of risks and address them

6. Do you have an interest in learning more about the following in the Jersey City area?
(please check one box for each item).

	Absolutely No	Mostly No	Neither Yes or No	Mostly Yes	Absolutely Yes
Pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Survey Questions: Risk Perception Factors

- Respondents were asked yes/no questions on:
 - Does lead exposure cause damage to human systems and developmental problems among children?
 - Has the soil or paint at their place of residence been tested for lead?
Any mitigation efforts implemented?
 - Do residents have a garden? If so, is topsoil used?
 - Demographic/background information

Results: Demographics

■ *Lead Paint Exposure*

- Perceived Risk as Low:
Male and larger family households, homemakers, unemployed, higher income, at current residence 5-10 yrs
- Perceived Risk as High:
Female, single person, student, unemployed, lower income, at current residence 5-10 yrs

■ *Soil Pollution*

- Perceived Risk as Low:
Hispanic/Other, retirees, employed/self-employed, homemaker, unemployed, students, at current residence > 10 yrs
- Perceived Risk as High:
at residence < 5 yrs

What risk factors are contributing low risk perception?

- No correlation with knowledge of adverse health effects
- Identified correlation between testing and prevention activities
- Respondents exhibiting inaction^(*) and halo effect^(^)
 - Grow plants directly in the ground^{*^}
 - Play and interact with pets in residence's grass/garden^{*^}
 - Purchase topsoil^{*}
 - Perceive ability to address pollution[^]

Results: Vulnerable Populations

- Sensitive populations
 - Tenants (via dialogue with residents)
 - Children under the age of 3
 - Long-term residents, between 5 to 10 years



Recommendations

- Address “optimism bias” by emphasizing resident’s ability to address environmental risks and improve long-term health
 - Additional “bottom-up” stakeholder engagement approaches should be considered
 - Encourage more landlord-tenant communication
 - Interactive opportunities: stakeholders participate in testing and mitigation activities
- Identify hazardous materials in close proximity to residences
 - Correlation with resident’s showing optimism bias but not exhibiting halo effect and inaction



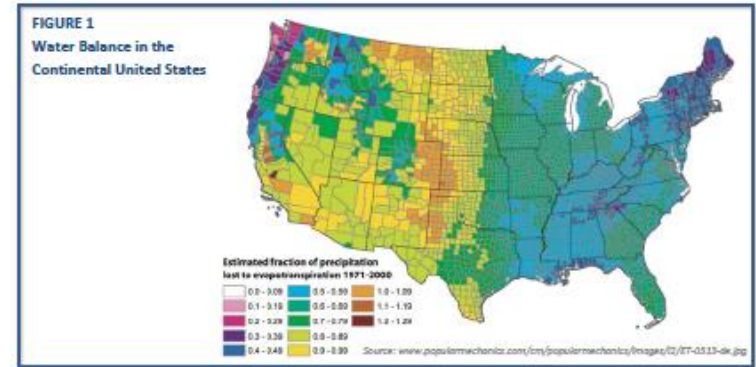
Other Applications in Remediation

Investigation & Remedial Evaluation: Identify Barriers to Reuse Opportunities

- Soil Bank



- Remediated Groundwater



GROUNDWATER CONSERVATION AND REUSE AT REMEDIATION SITES

DECEMBER 2013

THE SUSTAINABLE REMEDIATION FORUM

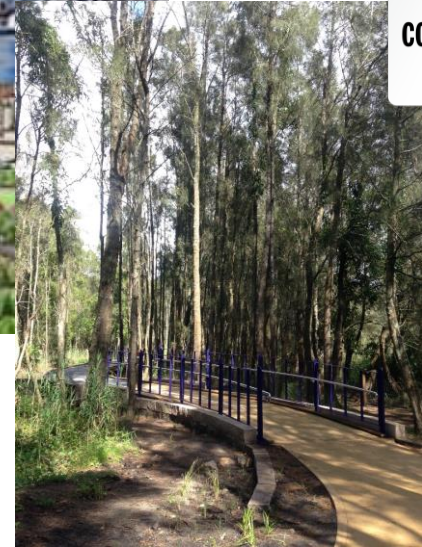


Investigation & Remedial Evaluation:

Acceptance of Risk Based Cleanup Approaches

1. Adaptive site management (i.e., site management using phased approach)
2. Alternate concentration levels (ACLs)/Risk characterization
3. Applicable or relevant and appropriate requirements (ARAR) waiver
4. "Conditional Closure" or "Low Threat" Closure
5. Deed, zone, use restrictions / alternate endpoints
6. Groundwater management zone
7. Groundwater reclassification
8. Long-term monitoring/natural attenuation
9. Technical impracticability waiver
10. Treatment and Closure in Place
11. Water Quality Trading

Remedial Action, Operation, & Maintenance: Community Acceptance



Remedial Action, Operation, & Maintenance: Community Participation



** Impacted stakeholders & Adjacent non-impacted parties*



Evaluation of the Role of Risk Perception in Stakeholder Engagement to Prevent Lead Exposure in an Urban Setting. Journal of Environmental Management. (Harclerode et al., 2016)

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