Welcome to the CLU-IN Internet Seminar

Food for Thought: Gardening on Superfund Sites

Sponsored by: U.S. EPA, Office of Solid Waste and Emergency Response, Office of Superfund Remediation and Technology Innovation

Delivered: May 23, 2012, 2:00 PM - 4:00 PM, EDT

Instructors:
Melissa Friedland, U.S. EPA, Superfund Redevelopment Program (friedland.melissa@epa.gov)
Michele Mahoney, U.S. EPA, Technology Innovation and Field Services Division (mahoney.michele@epa.gov)
Stephanie Cwik, U.S. EPA, Region 5 (cwik.stephanie@epa.gov)
Chris Choi, U.S. EPA, Region 5 (choi.christopher@epa.gov)
Mark Maddaloni, U.S. EPA, Region 2 (maddaloni.mark@epa.gov)

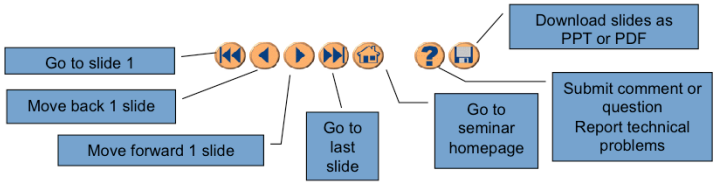
Moderator:
Michele Mahoney, U.S. EPA, Technology Innovation and Field Services Division (mahoney.michele@epa.gov)

Visit the Clean Up Information Network online at www.cluin.org

1

Housekeeping

- Please mute your phone lines, Do NOT put this call on hold
  - press *6 to mute #6 to unmute your lines at anytime
- Q&A
- Turn off any pop-up blockers
- Move through slides using # links on left or buttons



- This event is being recorded
- Archives accessed for free **http://cluin.org/live/archive/**

2

Food for Thought: Gardening on Superfund Sites

Melissa Friedland, EPA Superfund Program Manager for Redevelopment
Michelle Mahoney, EPA Technology Innovation and Field Services Division
Stephanie Cwik, EPA Region 5
Chris Choi, EPA Region 5
Mark Maddaloni, EPA Region 2

3

Presentation Overview

- Introduction: Melissa Friedland
  - Overview of Reuse
  - Agricultural Land Uses at Superfund Sites: Planting a Sustainable Future
- Tools and Resources
  - Best Practices: Michele Mahoney
  - Interim Guidelines: Stephanie Cwik
  - Business Plan: Chris Choi
- Case Studies
  - Michele Mahoney
- Lead Exposure Pathways
  - Mark Maddaloni
- How to Get Started
  - Regional Seeds: Melissa Friedland

What Is SRI?:
Superfund Redevelopment Initiative

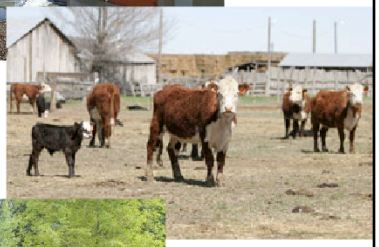
Working with communities and other partners in considering future use opportunities and integrating appropriate reuse options into the cleanup process

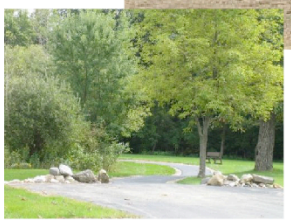
http://www.epa.gov/superfund/programs/recycle/index.html

5

Types of Reuse

- Commercial
- Public Service
- Residential
- Industrial
- Mixed Use
- Alternative Energy
- Green Space
  - Recreational
  - Ecological
- Agricultural





Commercial Reuse

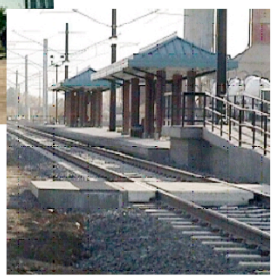
Tinkham Garage

Region 1: Londonderry, New Hampshire

Public Service Reuse

Murray Smelter

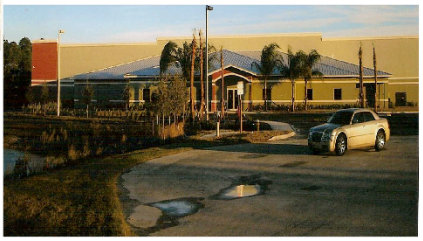
Region 8: Murray City, Utah



Industrial Reuse

Solitron Microwave

Region 4: Port Salerno, Florida



Mixed Reuse

Midvale Slag

Region 8: Midvale, Utah

Recreational Reuse

Auburn Road

Region 1: Londonderry, NH

Alternative Energy Reuse

Aerojet General Corporation

Region 9: Rancho Cordova, California

12

Ecological Reuse

Calumet Container

Region 5: Hammond, Indiana

13

Agricultural Reuse

Rose Township Dump

Region 5: Rose Township, Michigan

14

URBAN GARDENING

A CLOSER LOOK AT AGRICULTURAL REUSE

15

Types of Agricultural Reuse

- Traditional Farming
- Grazing and Ranchland
- Sustainable Forestry
- Waste Recycling and Alternative Energy Production
- Agricultural Research
- Community Food Systems and Urban Gardening

Agricultural Land Uses: Planting a Sustainable Future

Available on SRI's website:
http://www.epa.gov/superfund/programs/recycle/pdf/agricultural-reuse.pdf

17

Growing Food on Superfund Sites

- In a community food system, food production, processing, distribution and consumption are integrated to enhance public and environmental health.

- Community food systems can be located in rural or urban communities and function at the neighborhood scale or in larger areas, like cities, counties and regions.

Why Support Agriculture on Superfund sites?

- Superfund sites are often located in close proximity to large numbers of people, as well as lower income neighborhoods with limited access to fresh produce.
- These sites are large enough to support viable urban farms and available infrastructure can reduce start-up costs.
- The revitalization of these formerly vacant, stigmatized properties can help foster and sustain neighborhood revitalization efforts, replacing areas of community concern with local amenities.

TOOLS AND RESOURCES

Growing Gardens in Urban Soils

Michele Mahoney
EPA Office of Superfund Remediation & Technology Innovation

21

Reusing Potentially Contaminated Landscapes for Gardening and Agriculture

Information & Resources

22

EPA 542-F-10-011

REUSING POTENTIALLY CONTAMINATED LANDSCAPES:

Growing Gardens in Urban Soils

This fact sheet provides communities and individuals with general urban gardening information about:

- Common contaminants that can be found in urban soil.
- Ways to identify contaminants and reduce exposure.
- Improving soils and growing plants in mildly contaminated soil.
- Additional resources and technical assistance.

Introduction

Communities throughout the country are turning to urban agriculture and gardening as a reasonable option to increase their access to healthy, nutritious, and low-cost produce. Some of the sites that communities are using for urban gardens were previously home to industrial and commercial operations. A garden on abandoned land can become a new community asset by improving the visual look of a neighborhood and potentially increasing nearby property values. Community gardens provide many benefits, including healthier lifestyles by increasing activity levels, providing fresh produce, growing community pride, and nurturing social interactions and cooperation among people.

For communities interested in gardening on a site that might be contaminated, it is important to first determine the health and suitability of the soil at the site. It is a common gardening practice to test soil for characteristics such as pH and nutrient availability. When creating a garden on land with an industrial or commercial history, it is highly recommended that communities consider the site's land use history and test the soil accordingly for potential contamination. Knowledge of soil health and potential contamination are keys to helping communities identify and correct problems so that each urban garden is safe and productive.

The possibility of contamination at a garden site should not keep you from planning an urban garden there. This fact sheet presents steps that you can take to find out and address potential contamination at your site to help create a safe and healthy garden for your community.

U.S. Environmental Protection Agency
Office of Superfund Remediation and Technology Innovation

More information for the urban gardener on soil science, soil amendments, plants, contaminants and their health effects, and additional links is available on EPA's CLU-IN website: www.clu-in.org/ecotools/urbangardens.cfm.

EPA

EPA Publication

- Common contaminants
- Contaminant identification
- Exposure reduction
- Soil improvement
- Plant growth
- Resources
- Technical Assistance

Also Available in Spanish

23

Healthy Soil is Important for Your Garden

- Soil Nutrients
  - Testing
  - Additions
- Soil Physical Properties
  - Nutrient & Water Holding Capacity
  - Improvement
- Soil pH
  - Nutrient Availability
  - Testing
  - Adjustment

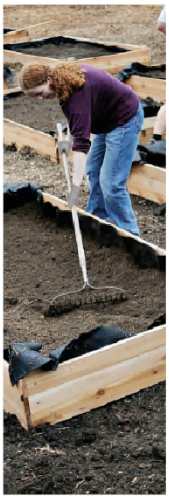
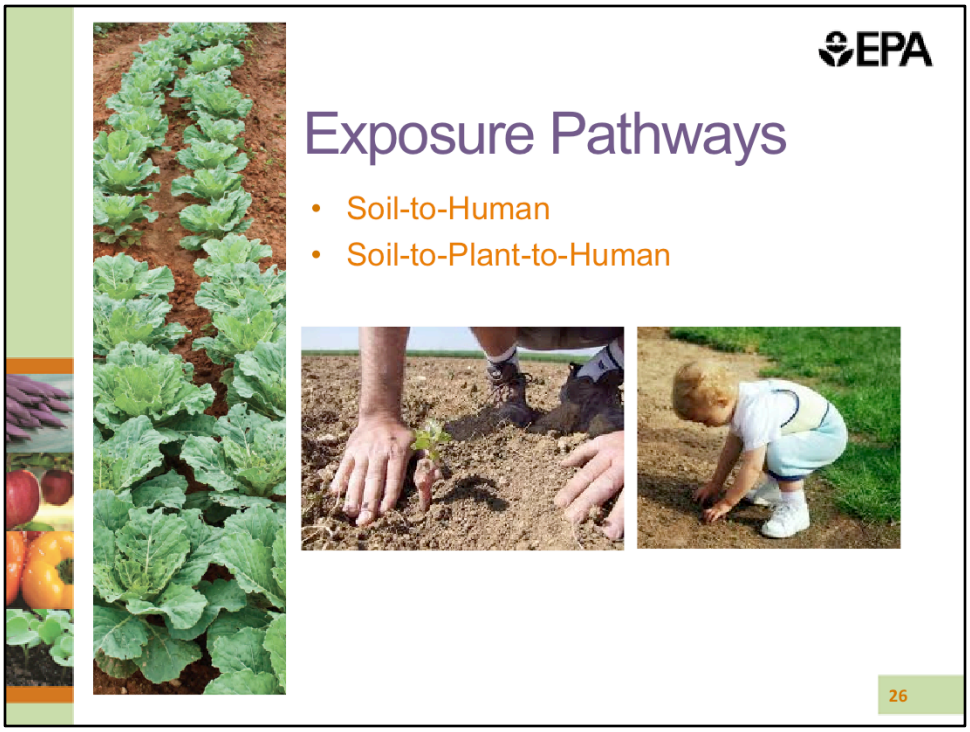


Table 1. Common Sources of Contamination[1]

General Source	Examples of Previous Site Uses	Specific Contaminants
Paint (before 1978)	Old residential buildings; mining; leather tanning; landfill operations; aircraft component manufacturing	Lead
High traffic areas	Next to heavily trafficked roadways or highways; near roadways built before leaded fuel was phased out	Lead, zinc, polycyclic aromatic hydrocarbons (PAHs)
Treated lumber	Lumber treatment facilities	Arsenic, chromium, copper
Burning wastes	Landfill operations	PAHs, dioxins
Contaminated manure	Copper and zinc salts added to animal feed	Copper, zinc
Coal ash	Coal-fired power plants; landfills	Molybdenum, sulfur
Sewage sludge	Sewage treatment plants; agriculture	Cadmium, copper, zinc, lead, persistent bioaccumulative toxins (PBTs)
Petroleum spills	Gas stations; residential/commercial/industrial uses (anywhere an aboveground or underground storage tank is or has been located)	PAHs, benzene, toluene, xylene, ethyl benzene
Pesticides	Widespread pesticide use, such as in orchards; pesticide formulation, packaging and shipping	Lead, arsenic, mercury, chlordane and other chlorinated pesticides
Commercial/industrial site use		PAHs, petroleum products, solvents, lead, other heavy metals (such as arsenic, cadmium, chromium, lead, mercury and zinc)
Dry cleaners		Stoddard solvent and tetrachloroethene
Metal finishing operations		Metals and cyanides

EPA's Toxic Release Inventory (TRI) can provide information to communities about sites where contaminants were released into the environment. The Envirofacts database allows users to enter location information, such as zip code, address or county location, to get information about releases in their area. The database is available online at: www.epa.gov/enviro.


EPA
Exposure Pathways
• Soil-to-Human
• Soil-to-Plant-to-Human
26

Wise Urban Gardening

- Build Raised Beds
- Removed Contaminated Soil
- Phytotechnologies
- Best Practices in the Garden

27

Phytotechnologies use plants to extract, degrade, contain, or immobilize pollutants in soil, groundwater, surface water, and other contaminated media

TABLE 1
PHYTOTECHNOLOGY MECHANISMS

Mechanism	Description	Cleanup Goal
Phytodegradation	Ability of plants to take up and break down contaminants within plant tissues through internal enzymatic activity	Remediation by destruction
Phytoextraction	Ability of plants to take up contaminants into the plant and sequester the contaminant within the plant tissue	Remediation by removal of plants containing the contaminant
Phytohydraulics	Ability of plants to take up and transpire water	Containment by controlling hydrology
Phytosequestration	Ability of plants to sequester certain contaminants into the rhizosphere through release of phytochemicals, and sequester contaminants on/into the plant roots and stems through transport proteins and cellular processes	Containment
Phytovolatilization	Ability of plants to take up, translocate, and subsequently volatilize contaminants in the transpiration stream	Remediation by removal through plants
Rhizodegradation	Ability of released phytochemicals to enhance microbial biodegradation of contaminants in the rhizosphere	Remediation by destruction

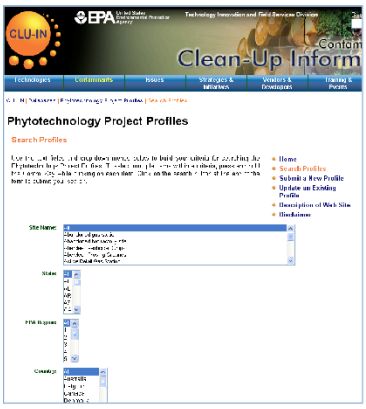
Source: Interstate Technical Regulatory Council (ITRC). 2009. Phytotechnology Technical and Regulatory Guidance and Decision Trees, Revised.

Contaminant	Phytotechnology Mechanism					Applications								Scale				
	Phytosequestration	Rhizodegradation	Phytohydraulics	Phytoextraction	Phytodegradation	Phytovolatilization	Constructed Treatment Wetland/Aquatic Plant Lagoon	Field Crops/Gardens	Landfill Cover	Riparian Buffer	Tree Hydraulic Barrier	Tree/Shrub Plantation	Hydroponic Solutions	Sorption to plant tissues	Hyperaccumulation	Greenhouse	Laboratory	Field	Pilot	Fullscale
Organic Compounds																				
BTEX		✓	✓		✓	✓	✓	✓			✓							✓	✓	✓
Chlorinated Solvents		✓	✓		✓	✓	✓						✓	✓				✓	✓	✓
PCBs	✓	✓	✓	✓													✓		✓	
Munitions		✓			✓		✓	✓				✓	✓			✓	✓	✓	✓	
PAHs		✓						✓				✓						✓		
Pesticides	✓		✓				✓	✓		✓							✓		✓	
Petroleum Products		✓			✓	✓	✓	✓				✓					✓	✓		✓
Inorganics																				
General																				
Arsenic			✓	✓				✓	✓						✓			✓	✓	✓
Cadmium	✓			✓			✓	✓				✓			✓	✓	✓	✓	✓	
Chromium	✓			✓			✓	✓								✓	✓	✓		
Copper				✓			✓	✓					✓		✓	✓	✓	✓		
Nickel				✓			✓	✓							✓	✓	✓			
Selenium	✓			✓		✓	✓					✓							✓	
Radionuclides	✓	✓		✓			✓	✓					✓		✓	✓	✓	✓		

EPA

29

More Information on Phytotechnologies



http://cluin.org/techfocus/default.focus/sec/Phytotechnologies/cat/Overview/

http://cluin.org/products/phyto/

http://cluin.org/download/remed/phytotechnologies-factsheet.pdf

Best Practices in the Garden

Building raised beds and mulching pathways is an excellent way to reduce the chance of coming into contact with potential contaminants. The recommendations below can add another layer of protection if you have raised beds or decide to do in-ground planting.

- **Locate** gardens away from old painted buildings and roads with heavy traffic.
- **Use** a thick layer of organic material such as compost or mulch. Place landscape fabric between ground soil and new, clean soil.
- **Watch** over small children to stop them from eating soil through hand-to-mouth play.
- **Wash** hands immediately after gardening and before eating to avoid accidentally eating soil.
- **Wear** gloves as a barrier between your hands and the soil.
- **Throw away** the outer leaves of greens, especially from the bottom of plants, before washing. Soil particles are most likely to be located on the outer leaves of leafy plants.
- **Wash** produce using running water.
- **Avoid bringing** contaminated soil into the home by:
    - Cleaning tools, gloves and shoes before bringing them indoors.
    - Putting highly soiled clothes in a bag before bringing them indoors and washing them promptly in a separate load.
    - Washing off excess dirt from crops, especially root crops and leafy vegetables, before bringing them indoors.
- **Peel** vegetables, especially root vegetables, which are in direct contact with soil.

EPA

- Growing Gardens in Urban Soils
  - Why is Healthy Soil Important for your Garden?
  - What is a Soil Contaminant?
  - How Do I Know if My Property is Contaminated?
  - How Could I Come into Contact with Contaminants while Gardening?
  - What Can I Do to Lower the Chances of Coming into Contact with Contaminants that May Be in Present in my Soil?
  - Can I Use Phytoremediation to Remove Lead from the Soil at my Site?
  - Where Can I Go to Find Technical Assistance for my Site?
  - What Additional Resources are Available on this Topic?

32

http://www.epa.gov/brownfields/urbanag/

EPA United States Environmental Protection Agency

LEARN THE ISSUES | SCIENCE & TECHNOLOGY | LAWS & REGULATIONS | ABOUT EPA

ALL EPA THIS AREA Advanced Search SEARCH

Brownfields

Contact Us Share

- Brownfields Home
- Basic Information
- Where You Live
- Newsroom
- Grants & Funding
- Laws & Statutes
- Tools & Technical Information
- Publications
- Partnerships
- Initiatives
- Sitemap

You are here: EPA Home » Brownfields » Urban Agriculture & Improving Local, Sustainable Food Systems

Urban Agriculture & Improving Local, Sustainable Food Systems

This website provides information for people pursuing agriculture projects as a part of brownfield redevelopment and reuse.

Before a property can be redeveloped, contaminants must be removed, capped or contained in ways that limit exposure risks. Urban agriculture projects can help bind contaminants while providing further benefits to the property and surrounding community. An urban farm or community garden can improve the environment, reduce greenhouse emissions, and improve access to healthy, locally grown food. Other possible benefits include promoting health and physical activity, increasing community connections, and attracting economic activity. For more detailed information, please read our basic Information page.

News & Highlights

- Urban Farm Business Plan Handbook
- Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices (24 pp, 1.9M)
- Brownfields and Urban Agriculture Reuse Special Webinar Series

Visitors to the Urban Agriculture web pages will find:

- Information on how to start an urban agriculture project;
- Success stories and information about ongoing urban agriculture projects;
- Resources & related links for information from EPA, other federal agencies and non-governmental organizations;
- Frequent questions about urban agriculture and the answers to them;
- Presentations and additional educational materials.

EPA
BROWNFIELDS AND URBAN AGRICULTURE:
Interim Guidelines for Urban Gardening Practices
Summer 2011
Partnership for Sustainable Communities
Urban Farm Business Plan Handbook
¿Cómo Crece Tu Jardín?
Vườn của Quý Vị Tăng Trưởng Như Thế Nào?
How Does Your Garden Grow?
Industrial Properties Renewed Through Agriculture
Reusing Land to Support Agriculture and Food Systems
34

Brownfields and Urban Agriculture:

Interim Guidelines for Safe Gardening Practices

Stephanie Cwik
U.S. EPA Region 5

Building Sustainable Communities 35

Urban Agriculture on Brownfield Sites

- Urban agriculture as a neighborhood revitalization strategy
- Multiple benefits
  - Removal of blight, greening of vacant properties
  - Addresses food deserts, food safety, nutrition
  - Children's health, green jobs, etc.
- How do we implement urban agriculture on Brownfields safely?

Urban Agriculture on Brownfield Sites

Where we started:

- Cleveland Targeted Brownfields Assessment
- Build Steering Committee of experts from diverse backgrounds
- Webinars:
  - State of Scientific Knowledge and Research Needs
  - Policy Barriers and Incentives to Reusing Brownfields for Community Gardens and Urban Agriculture Recorded and now available on the www.epa.gov/brownfields/urbanag website

What we found:

Question is two-fold

- How clean is clean for people to farm in? What is the risk to people, particularly children when farming soil on former Brownfield sites?
- How clean is clean for crops to grow in? What is the likelihood that contaminants will be taken up into the edible portions of plants?

37

Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices

Land Use	Common Contaminants
Agriculture, green space	Nitrate, pesticides/herbicides
Car wash, road and maintenance depot, vehicle services	Metals, petroleum products, sodium, solvents, surfactants
Dry cleaning	Solvents
Junkyards	Metals, petroleum products, solvents, sulfate
Machine shops and metal works	Metals, petroleum products, solvents, surfactants
Stormwater drains and retention basins	Metals, pathogens, pesticides/herbicides, petroleum products, sodium, solvents
Underground and aboveground storage tanks	Pesticides/herbicides, petroleum products, solvents
Wood preserving	Metals, petroleum products, phenols, solvents, sulfate
Chemical manufacturing, clandestine dumping, hazardous material storage and transfer, industrial lagoons and pits, railroad tracks and yards, research labs	Fluoride, metals, nitrate, pathogens, petroleum products, phenols, radioactivity, sodium, solvents, sulfate

(Adapted from Boulding and Ginn, 2004)

Identify Previous Use

Low Risk ↓ High Risk

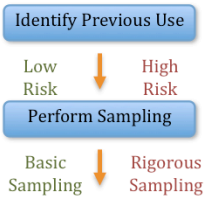
38

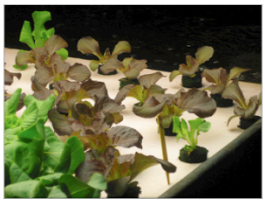
Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices

EPA

Perform Sampling

- Basic:
  - Soil quality as a soil medium
  - Nutrients, organic content, etc.
- Existing soil contamination:
  - Metals, organics
- Rigorous:
  - If previous use is high risk, then more sampling may be necessary
  - Contaminants of concern based on site history
  - Based on gardening type planned





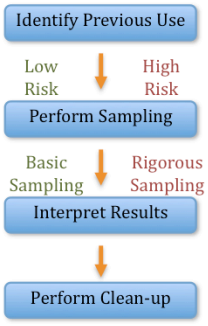
Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices

Interpret Results

- Work with State regulatory agencies to determine level of cleanup required for planned gardening type

Perform Clean-up

- Based on your gardening plan, you may find it is best to fully address soil clean up

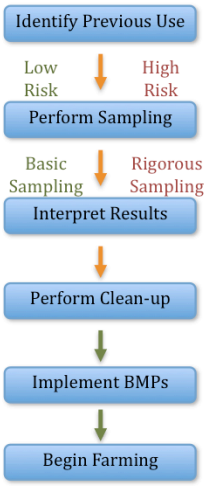


Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices

EPA

Implement Best Management Practices

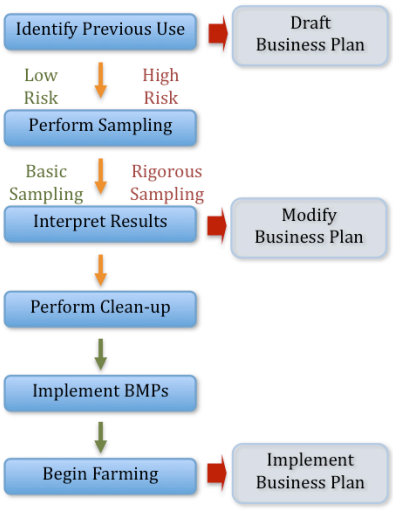
- Minimize risk by removing exposure routes
- Physical controls:
  - Build garden away from known contamination, busy roadways
  - Avoid treated lumber
  - Cover existing soil with mulch or woodchips
  - Use soil amendments to maintain neutral pH, add organic matter
  - Build raised beds or container gardens
- Emphasis on good habits
  - Peel root crops, remove outer leaves
  - Clean produce before eating, storing, teach kids
  - Wash hands, keep separate gardening shoes



41

Brownfields and Urban Agriculture: Interim Guidelines for Safe Gardening Practices

- Most successful urban agriculture projects follow a Business Plan
- Must be modified mid-development process to determine if cleanup necessary or type of gardening planned will be safe given contamination present in existing soils
- Likely to influence or change some degree in marketing, operations, financing
- Look at possible gardening type changes, product changes, move to inedible or orchard if soil exposure or uptake a problem, etc.



42

Urban Agriculture on Brownfield Sites

Continuing Involvement:

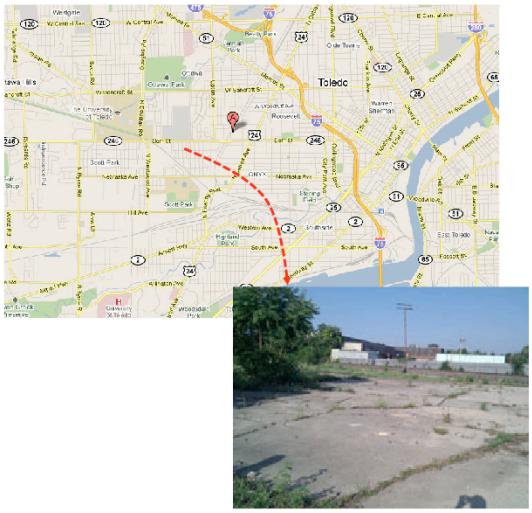
- HUD DOT EPA Partnership
  - Indianapolis composting study
  - Toledo Urban Farm Business Plan Handbook
- EJ Showcase Community Milwaukee – Urban Agriculture Code Audit
- ASTSWMO Urban Agriculture Toolbox for states
- Brownfield Assessments

Developing an Urban Farm Business Plan

Chris Choi
U.S. EPA Region 5

44

About the Fernwood Site



- Located between downtown and the University of Toledo
- Former Champion Spark Plug Facility
- ~2 acres site, next to train tracks
- Vacant for 16 years
- Obtained brownfield RLF cleanup grant through City

Community Goals for Fernwood Growing Center

- Provide an economically viable source of fresh locally grown fruits and vegetables and related products to our community
- Facilitate a greater understanding of the social impacts of food choices by encouraging healthy diets and lifestyles, providing nutrition education, and fostering a sense of community by reconnecting people with locally grown foods;
- Strengthen the local economy through the productive reuse of abandoned properties, local jobs, and job training; and
- Benefit public health and the environmental by cleaning up brownfields properties and utilizing operation and production techniques that minimize pollution and conserve resources.

How do we translate these goals into an operating farm?

46

Getting to Specifics...

While intention is good, it is essential to think about all the necessary steps to make it sustainable and successful.

Some basic things to consider:

- What crops will be grown?
- Who will do the work?
- How will crops be sold?
- What are the initial startup costs?
- What about operating costs?
- Who are the competitors?
- How will you address cleanup of the site?
- What are your community's codes regarding urban farming?

Windy City Harvest

Our Process

EPA, SRA International, and Vita Nuova worked with local organizations in the Toledo area to create a framework to answer these (and other) fundamental questions.

Toledo partners include:
Toledo Community Development Corp.
Lucas County Improvement Corporation
University of Toledo
Center for Innovative Food Technology
Congresswoman Marcy Kaptur's Office
The Collaborative
Toledo Grows
City of Toledo

Federal Partners:
HUD, DOT

Components: Marketing Strategy

- Market
  - Customers
- Product
- Distribution
- Sales
  - Pricing
  - Sales Volume
- Competition
- Promotion

Worksheet # 9 - Product

Describe the products to be offered and how it will compete for each market segment. Complete a worksheet for each market segment.

Market Segment:
What products will be offered?
What specific product characteristics meet the needs of the target market?
How are your products unique?
Why would a customer prefer your product to a competitor's?
What are the strengths and weaknesses of the product?
How does your business differentiate itself from competitors?

Components: Operational Strategy

- Crop Management
- Size and Capacity
- Physical Resource Needs
- Human Resource Needs
- Regulation & Policy

Worksheet # 18 –Physical Resources

Physical resources include land, buildings, and equipment necessary to produce and market your crops to meet the objectives of your marketing strategy. Describe your physical resource needs and how they will be acquired.

List the resources needed.	Describe the physical resource and how it will be acquired.
Land	
Buildings	
Other structures	
Equipment	
Supplies	

Components: Financial Strategy

- Expenses
- Income
- Income & Expense
- Fixed Assets
- Funding Requirements
- Risk Management

Worksheet # 28 – Income and Expense

Estimate the annual profit or loss for the farm. Profit or loss is calculated under the Worksheet # 29 (Income and Expense) tab of the Urban Farm Pro Forma spreadsheet. The spreadsheet includes formulas to calculate profit or loss based on the completion of Worksheet # 26 (Expense) and Worksheet # 27(Income) tabs. The table below is presented for reference.

Income and Expense Projection	Year 1	Year 2	Year 3	Year 4	Year 5
Income					
Projected Sales	-	-	-	-	-
Grants and other income	-	-	-	-	-
Total Income	-	-	-	-	-
Direct Operating Expenses					
Annual setup and removal	-	-	-	-	-
Total repairs and maintenance	-	-	-	-	-
Equipment and Tools	-	-	-	-	-
Seed & Soil Materials	-	-	-	-	-
Human Resources & Personnel	-	-	-	-	-
subtotal					
Indirect Operating Expenses					
Sales and Distribution	-	-	-	-	-
Marketing and Advertising	-	-	-	-	-
Utilities	-	-	-	-	-
Total Operating Expenses	-	-	-	-	-
Net Operating Income(Loss)	-	-	-	-	-
General and Administrative	-	-	-	-	-
One-time or Start-up Costs	-	-	-	-	-
Net Income Before Non-Cash Items	-	-	-	-	-
Depreciation and other non-cash expenses	-	-	-	-	-
Net Income Before Taxes	-	-	-	-	-
Income Taxes (if any)	-	-	-	-	-
Net Income (Loss)	-	-	-	-	-

Tying it All Together

- Introduction
- Vision Statement
- Mission Statement
- Goals

52

Potential Uses

- Map out strategy for the start-up and operation of the urban farm
- Provide important information to investors and funders
- Communicate plan to other stakeholders
- Track progress of business to goals

Availability and Download Information

Available for free download at:

http://www.epa.gov/brownfields/urbanag

Contact information:
Chris Choi
U.S. EPA, Region 5
Chicago
phone: 312.353.5006
email: choi.christopher@epa.gov

CASE STUDIES

55

Urban Gardens Across the Nation

Properties Affected by Contamination, Now with Successful Urban Gardens

56

American Street Tannery, PA

(Photograph Source: Northern Liberties Neighborhood Association)

57

Boyle Galvanizing, PA

(Photograph Source: Greensgrow Farm)

"With the right cleanup and lots of hard work, anything is possible."

-Mary Seton Corboy, Greensgrow Farm's co-founder and chief farm hand

58

Boyle Galvanizing, PA

(Photograph Source: Greensgrow Farm)

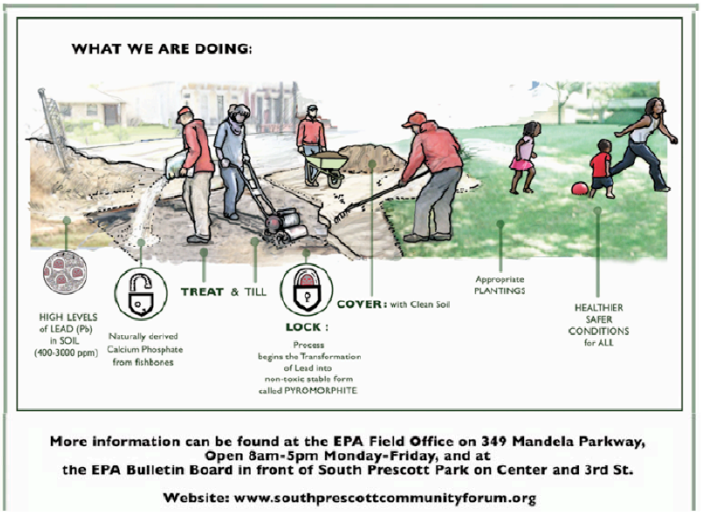
Rose Township, MI

Rose Township, MI

"The Rose Township Project could give us a homegrown solution to our energy, environmental and economic challenges, and a chance to return these contaminated lands to use"-*Deb Morrissett, Vice President of Regulatory Affairs at the Chrysler Group*

61

South Prescott, West Oakland, CA



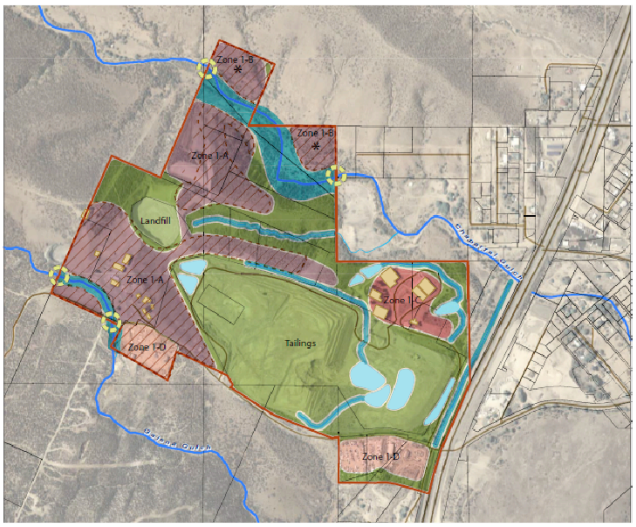
More information can be found at the EPA Field Office on 349 Mandela Parkway, Open 8am-5pm Monday-Friday, and at the EPA Bulletin Board in front of South Prescott Park on Center and 3rd St.

Website: www.southprescottcommunityforum.org

South Prescott , West Oakland, CA

Iron King Mine, AZ

Iron King Mine, AZ

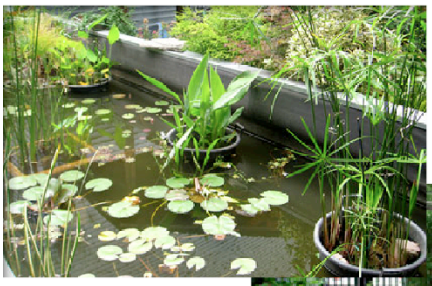


65

Southside Sanitary Landfill, IN

Southside Sanitary Landfill, IN

Bridge Plaza Garden, NY



(Photographs Source: http://www.nyrp.org/Parks_and_Gardens/Community_Gardens/Brooklyn/Bridge_Plaza_Community_Garden)

LEAD EXPOSURE PATHWAYS

69

Urban Gardening: Quantitative Assessment of Lead Exposure Pathways

Mark Maddaloni
US EPA Region 2

Urban Gardening Overview

- Multiple programs working in concert
  - TRW, ATSDR, Brownfields
- Fielding queries from program-specific sources/contacts
  - EPA and ATSDR receive numerous requests from communities near Superfund sites
  - Brownfields sites regarding safety of gardening
- All would benefit from a risk-based (quantitative) approach to determine what best management practices for limiting soil exposure would apply at different soil concentrations

Urban Gardening: Update

- Exposure pathways for lead-contaminated soil
  - Incidental ingestion while gardening
  - Track-in to the residence (contributes to soil-derived indoor dust)
  - Uptake into home grown produce (ingestion of produce)
  - Adherence to home grown produce(ingestion of produce)
    - Particularly root and leafy green vegetables
- A spreadsheet is in development to support that effort
  - Conceptual site model for human exposure to lead in garden soil
    - Different pathways may be appropriate for other contaminants (such as dermal absorption)
  - Also, the details of the exposure calculations for adult and child receptors to show what's missing (data gaps)

Urban Gardening: Next Steps

- Quantitative exposure pathway analysis provides context for the exposure
  - Beneficial reuse of land and need to limit lead exposure
    - CDC Recommendations to Reduce Lead Exposure for Children
  - Risk-Benefit Analysis for Gardening in Contaminated Soil
    - Healthy food
    - Exercise/aesthetic
    - Economic/environmental
  - Objective: provide risk-based soil lead levels that trigger best management practices to limit exposure while gardening in lead-contaminated areas
- Related Research
  - Phosphate amendment study: evaluation of evidence for an effect of phosphate treatment on soil lead bioavailability and arsenic mobilization

HOW TO GET STARTED

SRIs Regional Seeds

- Through its Regional Seeds, SRI provides communities with resources to determine which future uses are appropriate at a site.
- SRI recognizes that there is no one-size-fits-all approach when it comes to Superfund reuse so SRI provides different types of community support resources depending on the needs of the community.

A Closer Look at Regional Seeds

- John Garland Park

76

Helpful Links

- http://cluin.org/ecotools/urbangardens.cfm
- http://www.clu-in.org/download/misc/urban_gardening_fact_sheet.pdf
- http://www.epa.gov/brownfields/urbanag/
- http://www.epa.gov/brownfields/urbanag/basic.htm
- http://www.epa.gov/brownfields/urbanag/steps.htm
- http://www.epa.gov/superfund/programs/recycle/pdf/agricultural-reuse.pdf

Superfund Redevelopment Regional Coordinators

- Region 1- John Podgurski podgurski.john@epa.gov (617) 918-1296
- Region 2 - Gloria Sosa sosa.gloria@epa.gov (212) 637-4283
- Region 3 - Chris Thomas thomas.christopher@epa.gov (215) 814-5555
- Region 4 - Bill Denman denman.bill@epa.gov (404) 562-8939
- Region 5 - Tom Bloom bloom.thomas@epa.gov (312) 886-1967
- Region 6 - Casey Luckett luckett.casey@epa.gov (214) 665-7393
- Region 7 - Tonya Howell howell.tonya@epa.gov (913) 551-7589
- Region 8 - Fran Costanzi costanzi.frances@epa.gov (303) 312-6571
- Region 9 - Gary Riley riley.gary@epa.gov (415) 972-3003
- Region 10 -Tim Brincefield brincefield.timothy@epa.gov (206) 553-2100

Contact Information

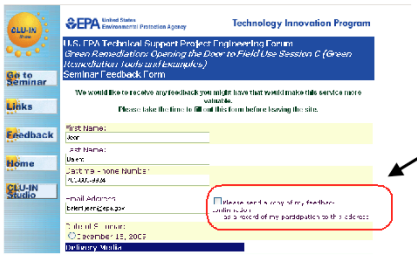
Melissa Friedland
Superfund Program Manager for Redevelopment
friedland.melissa@epa.gov
(703) 603-8864

Frank Avvisato
Redevelopment Initiative Project Officer
avvisato.frank@epa.gov
(703) 603-8949

Michele Mahoney
U.S. EPA Technology Innovation and Field Services Division
mahoney.michele@epa.gov
(703) 603-9057

Resources & Feedback

- To view a complete list of resources for this seminar, please visit the **Additional Resources**
- Please complete the **Feedback Form** to help ensure events like this are offered in the future



Need confirmation of your participation today?

Fill out the feedback form and check box for confirmation email.

New Ways to stay connected!

- Follow CLU-IN on Facebook, LinkedIn, or Twitter

https://www.facebook.com/EPACleanUpTech

https://twitter.com/#!/EPACleanUpTech

http://www.linkedin.com/groups/Clean-Up-Information-Network-CLUIN-4405740

81