Cleanup and Redevelopment Guide to Lead Mining and Smelting Sites in Region 7

JUNE 2023

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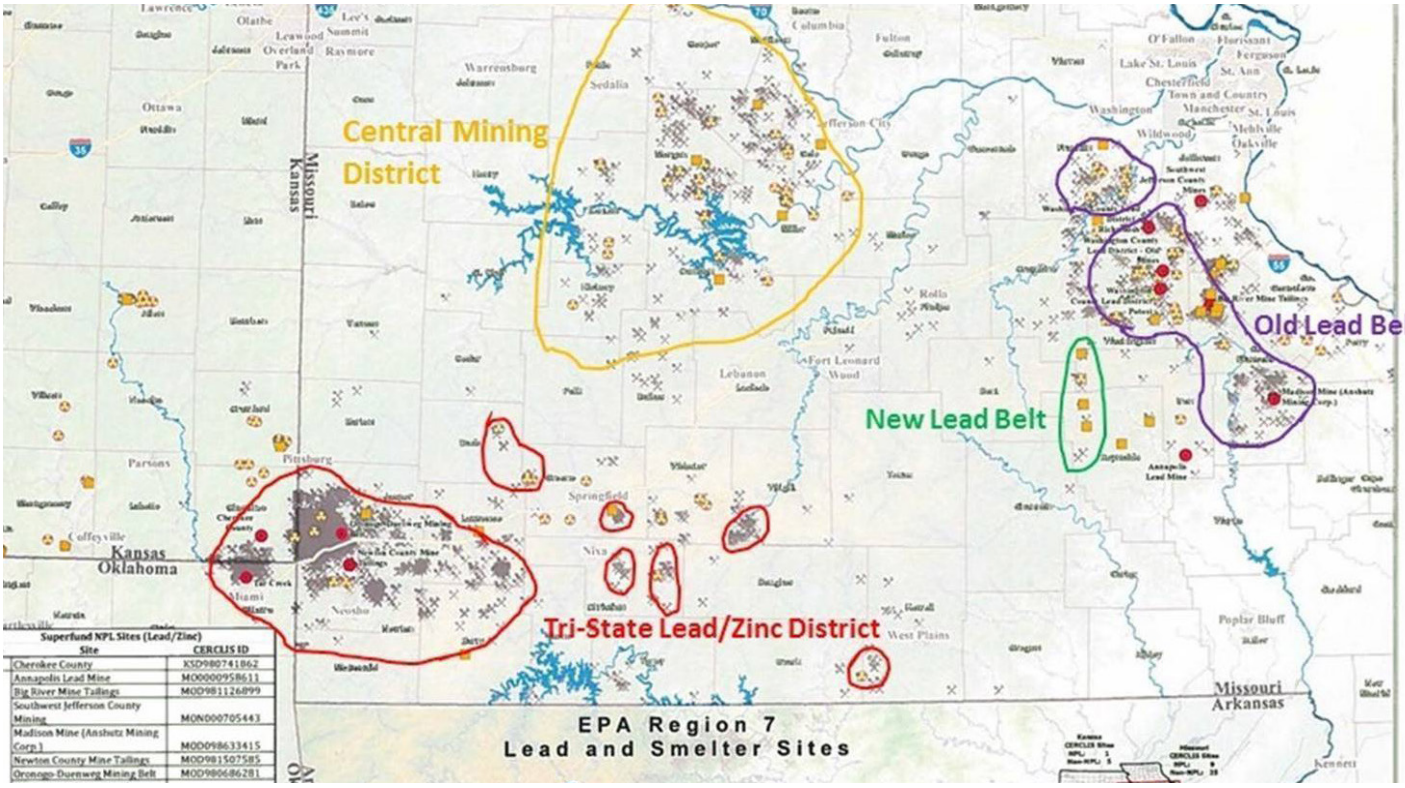
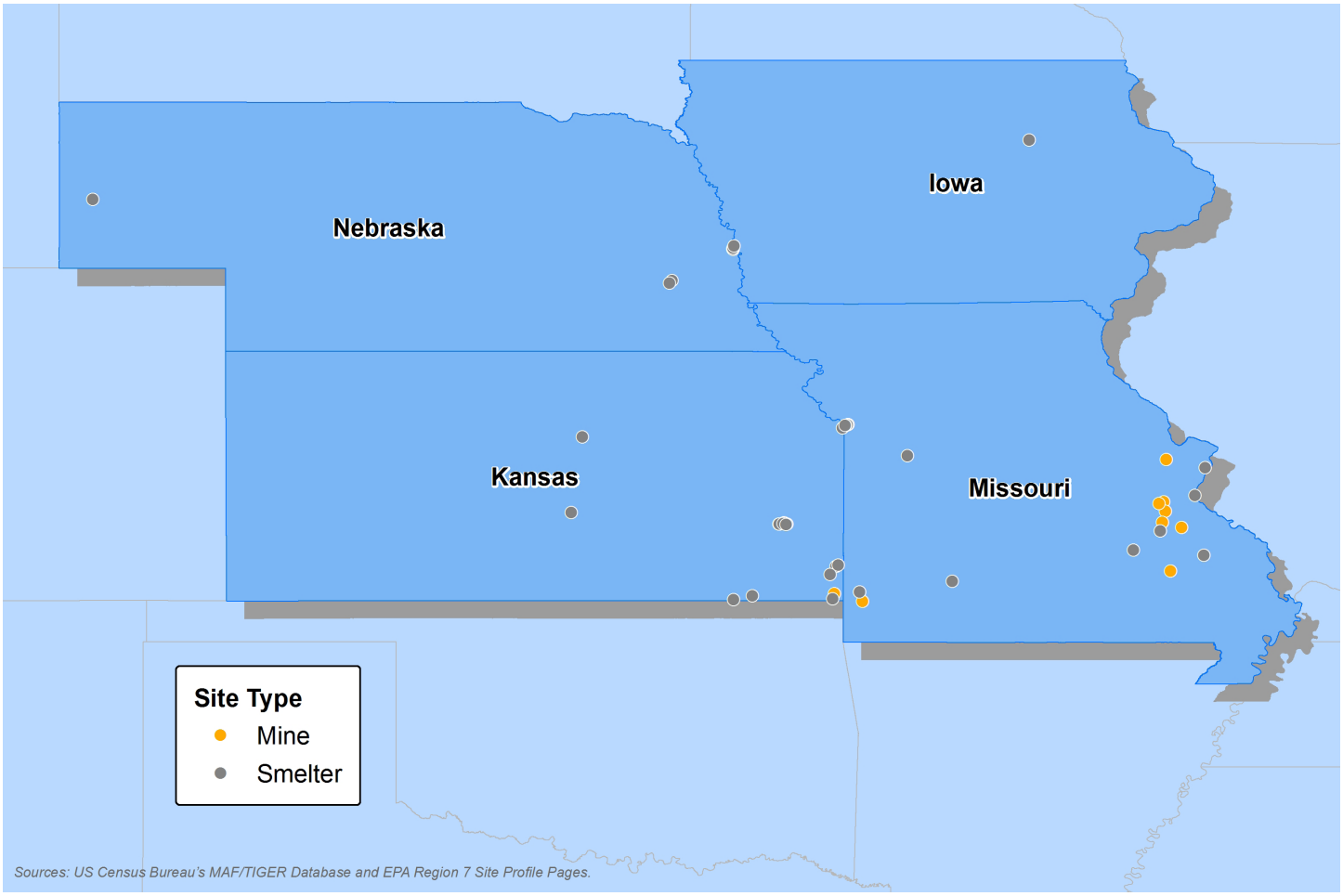
Introduction

America's Heartland/the lower midwest is the nation's largest lead-producing region. Mining operations in southeast Missouri's Old Lead Belt, the Tri-State Mining District encompassing parts of Missouri, Kansas and Oklahoma, and eastern Kansas and Nebraska have produced lead ore and refined products used in manufacturing, electronics, automotive and many materials that fuel the nation's economy. The states of Iowa, Missouri, Kansas, and Nebraska also supported lead processing activities, primarily known as smelting. These activities have supported local economies and established the region's expertise in mining and processing. Operations have also led to the release of lead, zinc, copper and arsenic contaminants into the environment.

Mining Districts





Former Mines and Smelter Sites Across the Region

Today, EPA's Region 7 office manages Superfund cleanup activities at about 50 mining and smelting sites that pose a unique set of challenges in protecting human health and environment, implementing cleanups and helping return sites to beneficial use.

Mining Sites

- Annapolis Lead Mine
- Big River Mine Tailings/St. Joe Minerals Corp.
- Cherokee County
- Madison County Mines
- Newton County Mine Tailings
- Omaha Lead
- Oronogo-Duenweg Mining Belt
- Southwest Jefferson County Mining
- Washington County Lead District - Furnace Creek
- Washington County Lead District - Old Mines
- Washington County Lead District - Potosi
- Washington County Lead District - Richwoods
- Weldon Spring Quarry/Plant/Pits (USDOE/ Army)

Smelter Sites

- 2nd and Smelter
- Acme Battery Manufacturing
- American Zinc & Lead Smelting Co - Former
- B & T Metals
- Baxter Springs Smelter
- Buick Smelter
- Centerview Smelter
- Cherokee Zinc Company (Weir Smelter)
- Concreto Smelter
- Culver Smelter
- Dearing Smelter
- East Iola Smelter
- East La Harpe Smelter
- Former Lawrence Shot & Lead Facility/Area
- Former Northwestern Metal 27th Street
- Former Omaha Shot Works Facility/Area
- Former Omaha White Lead
- Former United Zinc & Associated Smelter
- Freese
- Herculaneum Lead Smelter Site
- Kcs & R On Guinotte
- Madison County Mines
- National Compressed Steel
- Northwestern Metal Co.
- Omaha Lead
- Oronogo-Duenweg Mining Belt
- Ozark Circuits
- Pierce Metals
- Price Metal Refining
- Prime Western Smelter (Old)
- Shostak Metal
- St Louis Smelter Company
- Studer Container Service
- West La Harpe Smelter
- Washington County Lead District - Furnace Creek

Overview

This booklet offers a set of tools and materials representing successful approaches to lead site cleanup from around the region. The document is organized into five sections each focusing on one of the following five use types.

- Residential Reuse and Community Properties
- Recreation and Open Space Reuse
- Solar Renewable Energy
- Commercial Reuse and Community Revitalization
- Ecological Revitalization

Each section follows a common format that includes the following information.

- Describes the land uses or activities.
- Identifies benefits of the particular use.
- Offers best practices specific to integrating the particular use type or opportunity into mining and smelter site cleanup.
- Lists incentives typically used in funding and implementation.
- Provides case study examples and success stories.
- Offers a set of action steps to support landowners, businesses, development professionals, local officials, and partner agency staff and managers in advancing and implementing reuse during and after Superfund cleanup efforts.

Residential and Community Properties

Overview

Omaha Lead Superfund Site
Omaha, Nebraska

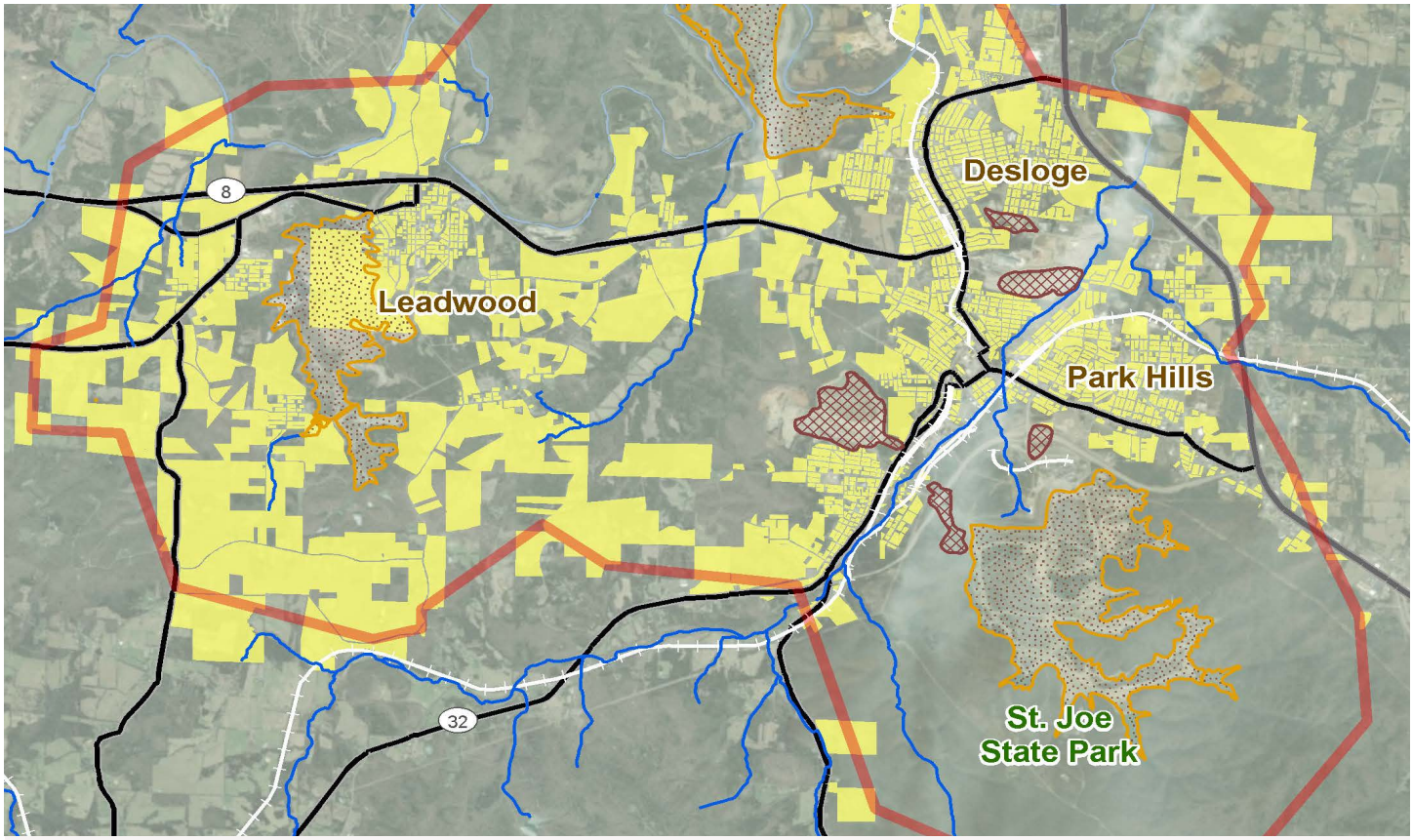
Former mining and smelting sites may involve the cleanup and continued use of residential properties. In Region 7, there are approximately 35 sites that have ongoing residential use or were remediated and are in residential reuse. Examples of housing uses include residential dwelling structures such as apartments, duplexes, condominiums, single-family homes and properties with mixed-uses that include housing.

At Superfund sites addressing cleanup from former mining and smelting impacts, EPA often undertakes comprehensive areawide or community wide investigations and phased cleanup. Cleanups involving residential properties and community properties such as public right of ways, parks and schools can take time.

EPA works to communicate status and plans regularly with the public and local partners throughout the process. EPA's role and decision-making process can involve many types of properties, both public and private, owner-occupied or renter-occupied, and cleanup activities can be highly visible throughout communities in daily life. A redevelopment pilot study for lead mining communities in St. Francois County, Missouri highlighted that communities affected by contamination of community and residential soils experience the intrusive effects of cleanup in daily life.

This document:

- Highlights best practices, tools and strategies for managing common challenges.
- Provides resources about community soil remediation to ensure that community members know what to expect and where to go for more information.
- Offers examples of proactive steps site teams and communities can take to mitigate the effects of community soils remediation.



CASE STUDY

Big River Mine Tailings Site
St. Francois County, Missouri

EPA is overseeing potentially responsible parties in conducting residential yard remediation in several communities across St. Francois County, Missouri. Cleanup of residential properties is underway within a designated Response Area where lead concentrations are greater than 400 parts per million (ppm). The response area is defined as any residential property within one-mile of the mine waste source areas – this is shown by the thick, red line on the map above. About 86% of properties tested within the response area have shown yard soils with lead levels over 400 ppm. EPA requires cleanup to ensure that the top 12" of soils in residential yards, schools and parks have lead concentrations below 400 parts per million. Approximately 4,000 properties within the Response Area requires cleanup, and the responsible party is prioritizing properties where there are children with elevated blood lead levels.

The map above shows the Response Area and residential properties in the communities of Desloge, Leadwood and Park Hills.

Best Practices

Schedule and sequence of yard cleanups

Community members often have questions about whether a property has been tested, or if it will be cleaned up and when. Site teams, local governments and community leaders can work together to ensure that tools and documents are in place to provide this information. Technical tools that provide up to date site or property status information for communities to access on an as needed basis can be a helpful way to empower communities.

CASE STUDY

Omaha Lead Site
Omaha, Nebraska

ASARCO was a lead-refining plant which operated from the early 1870's until 1997 and was located on approximately 23 acres on the west bank of the Missouri River in downtown Omaha, Nebraska. During the operational period, lead and other heavy metals were emitted into the atmosphere through smoke stacks and fugitive emissions from plant activities. The pollutants were transported downwind in various directions and deposited on the ground surface.

Today, the Omaha Lead Site encompasses 27 square miles inhabited by approximately 130,000 people in the eastern portion of Omaha. The Site includes only those residential properties where the EPA determines soil lead levels represent an unacceptable risk to human health. Commercial and industrial properties are excluded from the defined Site.

The Omaha Lead Registry

Community members, construction workers, developers or local government officials frequently have questions about soil cleanup status at a particular address or property. Cleanup status registries like the system EPA developed for the City of Omaha provide up to date information about cleanup status to help address a range of inquiries from homeowners, community members or prospective purchasers.

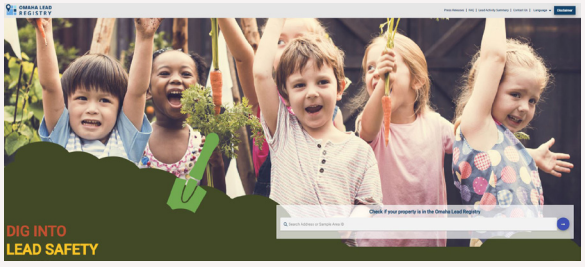
The registry provides several simple ways to access real-time information about property status.

An address search tool allows anyone to look up the status of a property by street address.

The registry also provides a site-wide dashboard listing information about the property status types as described below.

- Sampled
- To be Sampled
- Remediated
- To be Remediated
- Total Cubic Yards Remediated
- Paint Stabilization
- Dust Response

For more information: www.lead-registry.cityofomaha-ne.gov/en-US/.



Lessons from St. Francois County

At the Big River Mine Tailings Site, several affected communities noted that costs of municipal utility replacement are escalating due to the need for special soil handling practices. These costs were also cited as a potential deterrent for businesses or developers considering available sites. The State of Missouri has issued a set of Construction Standards specific to the "Old Lead Belt" region which provides requirements for slope grading and on-site soil handling to prevent dust and soil erosion. Municipal leaders and public works staff pointed out uncertainty about approved disposal areas for lead contaminated soils encountered during general construction and excavation activities.

Recommended Practices for Communicating Soil Handling Procedures:

- Provide clear guidelines that communicate appropriate soil handling practices and the locations of local disposal repositories.
- Make guidelines available to construction workers, property owners, developers, community members and municipal program staff.
- Ensure guidelines are communicated in English and Spanish (or other second languages where appropriate).
- Make guidelines available in hard copy and digital formats.
- For large rural or community-wide sites, consider developing a regional program that can help manage institutional controls, property status determinations, and information on soil handling, disposal and repositories. Examples of similar programs include the Madison County Mines Site (Madison County, MO), and Bunker Hill Site (Idaho).

Soil Handling Procedures

At many mining and lead sites, soil handling requirements provide a tool to manage potentially contaminated soil that may be excavated or encountered during typical construction and development projects. In some cases, cleanup may address contaminated soils to a certain depth, such as 1 or 2 feet below ground, leaving subsurface soils in the ground that, if disturbed, need to be handled properly onsite or hauled by truck to a designated landfill or repository for disposal. Additionally, soils lying beneath roadways, sidewalks, parking lots or buildings may also require proper handling or disposal.

Integrated Planning to Incorporate Neighborhood Land Use Plans and Needs Into Cleanup Process

Often community soil cleanup processes address different types of properties from residential to parks to schools and other public facilities. Planning for future uses at large sites can be complex, but it also provides an opportunity for community members to engage with EPA at various stages in the cleanup process, share goals and plans for reuse at key properties, and learn how cleanup plans and reuse plans can work together. The example below highlights an integrated reuse planning approach used for the Bessemer neighborhood in Pueblo, Colorado as part of cleanup related to the Colorado Smelter Superfund Site.

CASE STUDY

Colorado Smelter Revitalization Project Pueblo, Colorado

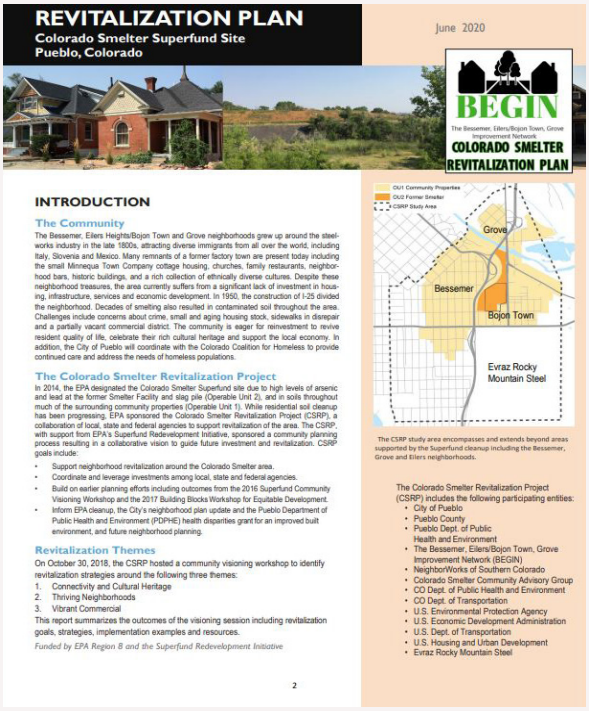
In 2014, the EPA placed the Colorado Smelter Superfund site on the National Priorities List due to high levels of arsenic and lead at the former Smelter Facility and slag pile (Operable Unit 2), and in soils throughout much of the surrounding community properties (Operable Unit 1). There are approximately 1,900 homes and another 400 parcels within the Operable Unit 1 study area of the Colorado Smelter Site, including vacant properties, commercial businesses, schools, parks and city-owned alleys and rights-of-way. EPA is using a phased cleanup approach. Residential homes are prioritized in the initial phase of cleanup.

While residential soil cleanup has been progressing, EPA sponsored the Colorado Smelter Revitalization Project (CSRP), a collaboration of local, state and federal agencies to support revitalization of the area.

Pueblo's Bessemer, Eilers Heights/Bojon Town and Grove neighborhoods grew up around the steelworks industry in the late 1800s, attracting diverse immigrants from all over the world, including Italy, Slovenia and Mexico. Many remnants of a former factory town are present today including the small Minnequa Town Company cottage housing, churches, family restaurants, neighborhood bars, historic buildings, and a rich collection of ethnically diverse cultures. Challenges include concerns about crime, small and aging housing stock, sidewalks in disrepair and a partially vacant commercial district. The community is eager for reinvestment to revive resident quality of life, celebrate their rich cultural heritage and support the local economy.

Through a series of visioning sessions hosted by the community and the Colorado Smelter Revitalization Project's local, state and federal partners, Superfund Redevelopment Program facilitated the development of the Colorado Smelter Revitalization Plan. The Plan is organized around three themes: Connectivity and cultural heritage, Thriving neighborhoods, and Vibrant commercial areas.

These guided the City's 2019 neighborhood plan update for the Bessemer and Eilers area. Visioning efforts also helped to inform the local land use planning process that is under the city and county jurisdiction. The Revitalization Plan was approved by City Council on October 26, 2020. Additionally, the local health department was awarded a $350,000 grant from the Colorado Health Foundation to support 1.5 staff over two years to facilitate the CSRP and help with the successful implementation of some of the community's revitalization projects.


REVITALIZATION PLAN
Colorado Smelter Superfund Site
Pueblo, Colorado
June 2020
BEGIN
The Bessemer, Eilers/Bojon Town, Grove Improvement Network
COLORADO SMELTER REVITALIZATION PLAN
INTRODUCTION
The Community
The Bessemer, Eilers Heights/Bojon Town and Grove neighborhoods grew up around the steelworks industry in the late 1800s, attracting diverse immigrants from all over the world, including Italy, Slovenia and Mexico. Many remnants of a former factory town are present today including the small Minnequa Town Company cottage housing, churches, family restaurants, neighborhood bars, historic buildings, and a rich collection of ethnically diverse cultures. Despite these neighborhood treasures, the area currently suffers from a significant lack of investment in housing, infrastructure, services and economic development. In 1950, the construction of I-25 divided the neighborhood. Decades of smelting also resulted in contaminated soil throughout the area. Challenges include concerns about crime, small and aging housing stock, sidewalks in disrepair and a partially vacant commercial district. The community is eager for reinvestment to revive resident quality of life, celebrate their rich cultural heritage and support the local economy. In addition, the City of Pueblo will coordinate with the Colorado Coalition for Homeless to provide continued care and address the needs of homeless populations.
The Colorado Smelter Revitalization Project
In 2014, the EPA designated the Colorado Smelter Superfund site due to high levels of arsenic and lead at the former Smelter Facility and slag pile (Operable Unit 2), and in soils throughout much of the surrounding community properties (Operable Unit 1). While residential soil cleanup has been progressing, EPA sponsored the Colorado Smelter Revitalization Project (CSRP), a collaboration of local, state and federal agencies to support revitalization of the area. The CSRP, with support from EPA's Superfund Redevelopment Initiative, sponsored a community planning process resulting in a collaborative vision to guide future investment and revitalization. CSRP goals include:
- Support neighborhood revitalization around the Colorado Smelter area.
- Coordinate and leverage investments among local, state and federal agencies.
- Build on earlier planning efforts including outcomes from the 2016 Superfund Community Visioning Workshop and the 2017 Building Blocks Workshop for Equitable Development.
- Inform EPA cleanup, the City's neighborhood plan update and the Pueblo Department of Public Health and Environment (PDPHE) health disparities grant for an improved built environment, and future neighborhood planning.
Revitalization Themes
On October 30, 2018, the CSRP hosted a community visioning workshop to identify revitalization strategies around the following three themes:
1. Connectivity and Cultural Heritage
2. Thriving Neighborhoods
3. Vibrant Commercial
This report summarizes the outcomes of the visioning session including revitalization goals, strategies, implementation examples and resources.
Funded by EPA Region 8 and the Superfund Redevelopment Initiative
2
OU1 Community Properties
OU2 Former Smelter
CSRP Study Area
Grove
Bessemer
Bojon Town
Evraz Rocky Mountain Steel
The CSRP study area encompasses and extends beyond areas supported by the Superfund cleanup including the Bessemer, Grove and Eilers neighborhoods.
The Colorado Smelter Revitalization Project (CSRP) includes the following participating entities:
- City of Pueblo
- Pueblo County
- Pueblo Dept. of Public Health and Environment
- The Bessemer, Eilers/Bojon Town, Grove Improvement Network (BEGIN)
- NeighborWorks of Southern Colorado
- Colorado Smelter Community Advisory Group
- CO Dept. of Public Health and Environment
- CO Dept. of Transportation
- U.S. Environmental Protection Agency
- U.S. Economic Development Administration
- U.S. Dept. of Transportation
- U.S. Housing and Urban Development
- Evraz Rocky Mountain Steel

Resources

Community soil cleanups involving residential properties can take time. Often communities will form organizations or utilize existing neighborhood organizations or community groups to coordinate with EPA and share information throughout their broader communities. EPA offers a variety of resources and types of technical assistance to help communities. EPA offers the resources and tools below to help ensure that communities are able stay up to date on cleanup activities and site status, share interests and concerns, get answers to questions, and plan for future land use and redevelopment.

Superfund Redevelopment Program Reuse Planning Support

Each year, EPA Superfund Redevelopment provides technical assistance to the Regions in the form of "Regional Seeds" to support the productive reuse and redevelopment of Superfund sites.

Regional seed support typically involves reuse planning activities, which provide site teams and local stakeholders with technical assistance to facilitate redevelopment, remove barriers to productive reuse, and ensure future use is well aligned with the cleanup and removal/remedial process. Typical reuse planning support activities include:

- Reuse Situation Assessment
- Reuse Assessment
- Reuse Plan
- Community Engagement
- Inter-Agency Facilitation and Coordination

For More Information: www.semspub.epa.gov/work/HQ/100002373.pdf

Community Involvement Resources

Community involvement is the name EPA uses to identify its process for engaging in dialogue and collaboration with communities affected by Superfund sites. EPA community involvement is based on the belief that community members have a right to know what the Agency is doing in their community and to have a say in it. Its purpose is to give communities the opportunity to become involved in the Agency's activities and to help shape the decisions that are made. Superfund community involvement is not a public relations effort to sell the Agency or its plans, nor is it just the distribution of information. Remedies that have community concerns and interests factored into them are less controversial and more likely to be accepted. Community involvement is the vehicle EPA uses to make sure the community's concerns and interests are included in Agency decision-making.

EPA has a variety of programs designed to promote early and effective community involvement during Superfund decision-making. Three common resources are highlighted in the right-hand column.

Community Advisory Groups

A CAG is made up of representatives of diverse community perspectives. It provides a public forum for community members to present and discuss their needs and concerns related to Superfund decision-making and hear regular updates from EPA regarding site status. Communities reach out to EPA Community Involvement Coordinator's to request support for a Community Advisory Group.

For more information: www2.epa.gov/superfund/community-advisory-groups

Technical Assistance Services to Communities

The national Technical Assistance Services for Communities (TASC) program provides independent assistance through an EPA contract to help communities better understand the science, regulations and policies of environmental issues and EPA actions. Under the TASC contract, a contractor provides scientists, engineers and other professionals to review and explain information to communities. The services are determined on a project-specific basis and provided at no cost to communities. This assistance supports community efforts to get more involved and work productively with EPA to address environmental issues.

TASC services can include community education, needs evaluations, plan development, and assistance to help community members work together to participate effectively in environmental decision-making.

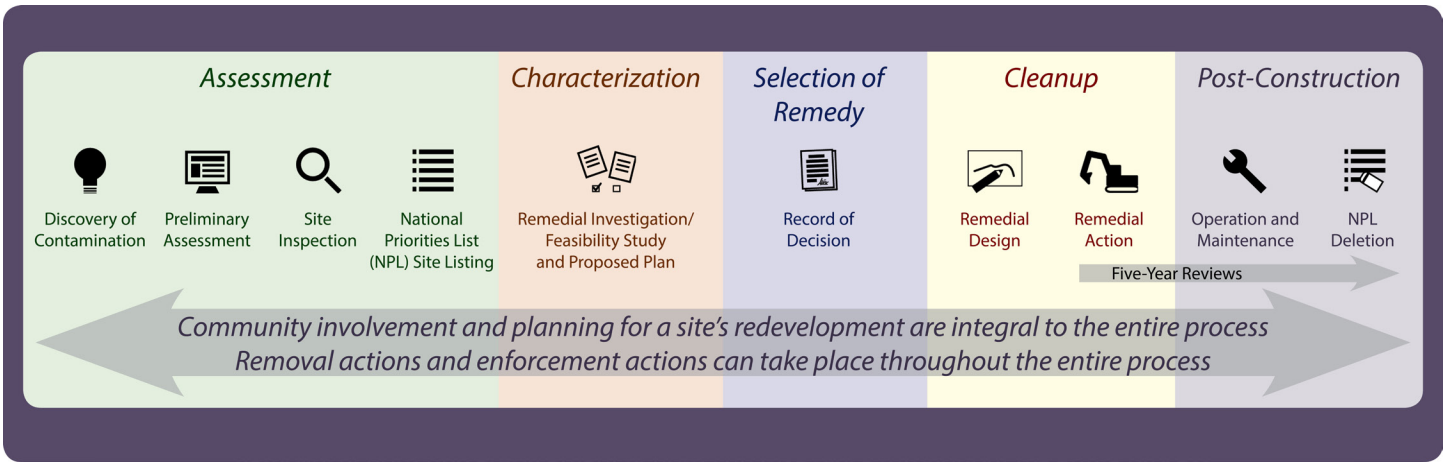
For more information: www.epa.gov/superfund/superfund-technical-assistance-communities

Technical Assistance Grants

Through Technical Assistance Grants, EPA provides money to community groups to hire a technical advisor who can help them understand Superfund site technical information. An initial amount of up to $50,000 is available to qualified groups for any site listed on EPA's National Priorities List, or proposed for listing on the NPL where a response action has begun. Only one grant is available at a time for each site.

For more information: www2.epa.gov/superfund/technical-assistance-grant-tag-program

Below are examples of user-friendly communication tools to help answer questions and manage community expectations. Examples below include Superfund cleanup process diagrams, a citizen's guide to soil excavation, and a brochure on community lead safety.



Superfund Remedial Process

Citizens Guide to Excavation of Contaminated Soil

This 2-page guide, illustrated below, uses plain language responses to common questions citizens may have about soil excavation and remediation.

For more information visit www.epa.gov/sites/default/files/2015-04/documents/a_citizens_guide_to_excavation_of_contaminated_soil.pdf

Colorado Smelter Lead Safe Brochure

This flyer-style brochure, illustrated below, includes English and Spanish language versions of a simple set of guidelines for lead safety at residential properties affected by neighborhood-wide lead impacts. Specific to the Colorado Smelter Superfund Site in Pueblo, Colorado, this document addresses issues common to lead smelters across Region 7.


A Citizen's Guide to Excavation of Contaminated Soil

EPA

What Is the Excavation of Contaminated Soil?

Excavation of contaminated soil from a site involves digging it up for "ex situ" (above-ground) treatment or for disposal in a landfill. Excavation also may involve removing old drums of chemicals and other buried debris that might be contaminated. Removing these potential sources of contamination keeps people from coming into contact with contamination and helps speed the cleanup of contaminated groundwater that may be present.

How Does It Work?

Before excavation can begin, the contaminated areas must be identified. This requires researching past activities at the site to identify what contaminants may have been released and where. The soil is then tested to better define where contaminants are present.

Contaminated soil is excavated using standard construction equipment, like backhoes and excavator trackhoes. The equipment chosen depends on how large and deep the contaminated area is, and whether access is limited by the presence of buildings or other structures that cannot be moved. Long-arm excavators can reach as deep as 100 feet below ground, but excavations are generally limited to much shallower depths due to safety concerns and difficulty keeping the hole open. Sometimes soil is excavated below the water table, which requires walling off the contaminated area and pumping out the water to keep dry during excavation.

Worker collects soil samples to confirm that soil left onsite is clean.

If excavated soil will be disposed of in a landfill, it may be placed directly on a dump truck for transport. If it is to be disposed of elsewhere on the site or treated, it first may be stock piled on plastic tarps or in containers. The soil is then covered with tarps to prevent wind and rain from blowing or washing it away and to keep workers from coming into contact with contaminated soil. Excavation is complete when test results show that the remaining soil around the hole meets established cleanup levels.

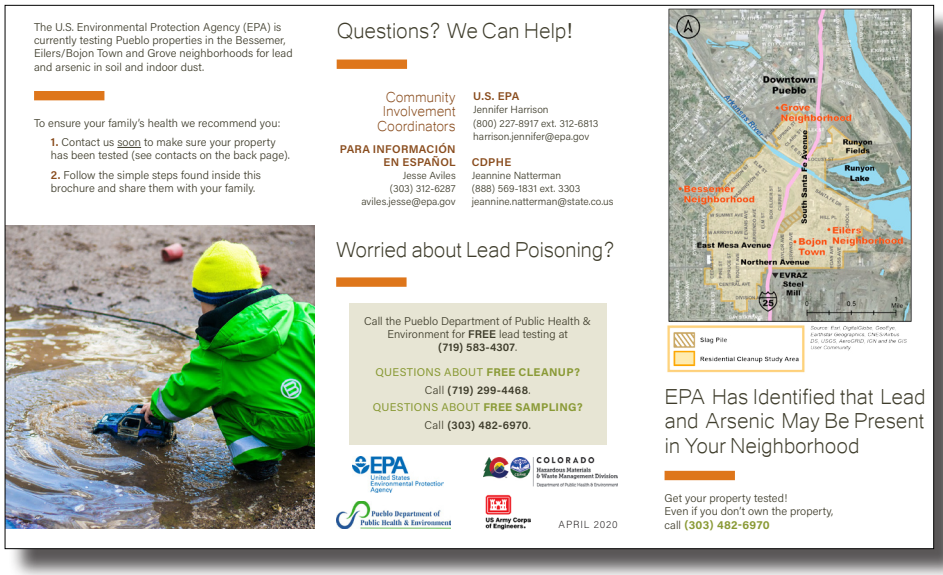
The excavated soil may be cleaned using a mobile treatment facility brought to the site or disposed offsite. If the soil is treated onsite, treated soil may be used to fill in the excavated area. Clean soil obtained from other locations may be needed to fill in holes as well. After an excavation is filled in, the area may be landscaped to prevent soil erosion and make the site more attractive.

How Long Will It Take?

Excavating contaminated soil may take as little as one day or as long as several years. The actual time it takes to excavate will depend on several factors. For example, it may take longer where:

- The contaminated area is large, very deep, or below the water table.

Soil piles are covered with plastic tarps during excavation.


The U.S. Environmental Protection Agency (EPA) is currently testing Pueblo properties in the Bessemer, Eilers/Bojon Town and Grove neighborhoods for lead and arsenic in soil and indoor dust.

To ensure your family's health we recommend you:

1. Contact us soon to make sure your property has been tested (see contacts on the back page).
2. Follow the simple steps found inside this brochure and share them with your family.

Questions? We Can Help!

Community Involvement Coordinators

U.S. EPA
Jennifer Harrison
(800) 227-8917 ext. 312-6813
harrison.jennifer@epa.gov

PARA INFORMACIÓN EN ESPAÑOL
Jesse Aviles
(303) 312-6287
aviles.jesse@epa.gov

CDPHE
Jeannine Natterman
(888) 569-1831 ext. 3303
jeannine.natterman@state.co.us

Worried about Lead Poisoning?

Call the Pueblo Department of Public Health & Environment for **FREE** lead testing at **(719) 583-4307**.

QUESTIONS ABOUT **FREE CLEANUP?**
Call **(719) 299-4468**.
QUESTIONS ABOUT **FREE SAMPLING?**
Call **(303) 482-6970**.

EPA United States Environmental Protection Agency
Pueblo Department of Public Health & Environment
COLORADO Hazardous Materials & Waste Management Division
US Army Corps of Engineers.
APRIL 2020

Downtown Pueblo
Grove Neighborhood
Runyon Fields
Runyon Lake
Bessemer Neighborhood
Eilers Neighborhood
Bojon Town
East Mesa Avenue
Northern Avenue
EVRAZ Steel Mill
South Santa Fe Avenue
Slag Pile
Residential Cleanup Study Area

EPA Has Identified that Lead and Arsenic May Be Present in Your Neighborhood

Get your property tested!
Even if you don't own the property, call **(303) 482-6970**

Implementation Steps to Promote Community Properties Reuse

IMPLEMENTATION STEPS		POTENTIAL TOOLS AND ACTIONS TO ADVANCE STRATEGY
1	**Engage stakeholders/build partnerships**	▪ Communities and site teams coordinate to identify community involvement needs and establish ways to share information over the course of cleanup and reuse processes.
2	**Assess suitability and opportunities**	▪ EPA establishes operable units or divisions to clarify specific areas for further study. ▪ Communities coordinate with EPA to evaluate future use plans, community goals and priorities and implications for cleanup at key properties, or at a larger operable unit or sitewide level. ▪ Communities and partners work through collaborative revitalization planning process to identify broader neighborhood revitalization priorities, themes, and priority projects. ▪ Communities develop revitalization plan or strategy, which can help delineate roles and activities that are part of Superfund-related cleanup, as well as community or private sector driven development or revitalization activities. ▪ Identify redevelopment or revitalization projects needing coordination with EPA.
3	**Develop funding strategy**	▪ Identify a priority list of projects. ▪ Clarify partners, lead entities, partners, and potential funding sources to be involved in each project. ▪ Hold developer, agency, or investor forums to increase visibility of priority projects.
4	**Implement/construct end use**	▪ Local stakeholders and EPA coordinate during implementation for public infrastructure, revitalization and development permitting as well as private sector development projects with EPA's cleanup plans
5	**Promote long-term stewardship**	▪ Ensure institutional controls are developed and refined in coordination with local land use planning and permitting processes. ▪ EPA works with local planning, code enforcement and public works to ensure institutional controls are integrated into zoning or site specific development approval processes.

Recreation and Open Space

Overview

Throughout Region 7, reuse is underway at parks, forested areas, trails, and sporting venues, providing valuable open space resources for communities.

As of 2020, EPA's Superfund Redevelopment Program tracked six mining sites in Region 7 that are in recreational use. These six sites are supporting recreational activities in over 30 national, state and municipal parks. Recreational activities range from active uses, such as athletic fields, to passive uses, such as trails and camp sites, to motorized recreational vehicle use.

The most frequently-identified recreational uses at mining sites were:

- Playgrounds
- Baseball or softball fields
- Picnic areas
- Trails
- Tennis courts

Other amenities include running tracks, basketball and volleyball courts, pools, equestrian facilities, boat launches and skate parks.

Benefits

Reusing cleaned-up mining sites can provide valuable opportunities for new recreation facilities. Reusing these sites reclaims properties that would otherwise be left vacant while supporting public health and community wellbeing. Formerly-contaminated mining sites may not be compatible with residential or commercial use because of their level of contamination, topography, or rural location, but these sites are often suitable for recreational reuse.

Mining sites in recreational use provide a range of benefits, such as those listed below:

- Improve quality of life through amenities such as parks, trails and civic spaces.
- Provide resources and opportunities to encourage healthy and active lifestyles.
- Support healthy habitat for wildlife.
- Support increased property values and tax revenues.
- Increase local sales, directly or indirectly.
- Attract new investment to communities.
- Increase site security to prevent trespassing and unwanted activities while protecting the restored property's condition.
- Support and maintain remedy protectiveness.
- Provide much-needed open space and playgrounds for communities.

Best Practices

Integrating Cleanup and Recreational Reuse

Recreational reuse may be possible at many different types of lead sites and mining sites. The following pages highlight three successful approaches for recreation and open space reuse: community parks; tailings piles and capped areas; and haul roads and rail lines.

Community Parks

Superfund cleanups are remediating existing public parks through removal, treatment and capping, to returns these areas to beneficial use.

CASE STUDY

King Jack Park, Oronogo-Duenweg Mining Belt – Continued Reuse

The Oronogo-Duenweg Mining Belt site near Joplin, Missouri, includes mine waste areas across roughly 270 square miles covering parts of Jasper and Newton counties. During cleanup, EPA filled a 12-acre former mine pit and waste area, known as the Sucker Flats mine pit. For the existing King Jack Park, located next to the mine pit, the cleanup effort provided new level areas that supported park expansion and infrastructure improvements. As part of this effort, King Jack Park was expanded by 23 acres, and a former haul road was converted into a new park access road with direct connections to commercial areas and Webb City's downtown area along Old Route 66.

Stabilized Tailings Piles and Capped Areas

Features unique to mining sites such as tailings piles are commonly stabilized and capped as part of site cleanups. The result provides large level areas suitable for a range of recreational uses.

Considerations for Capped Areas and Tailings Piles

Capped areas and remediated tailings piles generally offer level areas with potential to support surface uses, including recreation. The size, elevation and profile of the area; cap or cover depth; and remediation process and ownership are all key factors that can affect the viability of reuse at capped areas and mine waste piles. Reuse options that require stable structures on capped areas can require careful due diligence to ensure that structures can be built in a way that is compatible with the remedy and also remain stable. Below is an overview of key factors to consider when siting small structures or utilities on capped areas and tailings areas, along with several successful park and sports complex reuse examples.

CASE STUDY

Park Hills Sports Complex, Big River Mine Tailings Site

In Park Hills, Missouri, the potentially responsible party, Doe Run Resources, stabilized and capped a portion of the former Federal Tailings pile, preparing the former mine waste area for reuse as a community recreation complex. The Park Hills Sports Complex is an important economic development driver with opportunities for growth. Park Hill's youth and adult recreation programs support successful recreation leagues with participation by 35 adult league softball teams and 300 youth soccer players in the City's recreation leagues.

Geotechnical engineering assessments—settlement/subsidence

Depending on size and profile, features like landfills, caps and mine waste areas may be prone to settlement and subsidence that could create an unstable surface for structures. A geotechnical evaluation can look at whether expected settlement will affect planned reuses. Various steps can be taken to handle expected settlement. Special design techniques may be required to reduce settlement impacts and long-term maintenance costs.

Stormwater runoff

Site capping can significantly increase runoff and the need for stormwater controls. Surface drainage must be directed away from steep slopes or collected. To avoid underground piping, which may cause problems with gas collection and settlement, storm drainage should be handled, where possible, on the surface with swales and open channels.

Surface slope

Consider the slope required by environmental regulators for proper drainage and the slope needed for the planned reuse.

Side slopes

Consider and vary the degree of slope where possible to give a natural appearance. Benched slopes provide an opportunity for pathways and drainage controls.

Buildings and utilities

Include special design approaches for structures and utility services on landfills. Utilities can be placed in trenches and wrapped with geotextile to minimize settlement damage. Structures should be lightweight with spread footings and include methane venting and monitoring systems. Geotextile use under pavements can reduce pavement maintenance.

Technical Assistance Resource: Reuse Planning

EPA's Superfund Redevelopment Program provides technical assistance to assist with integrating recreation and open space reuse goals with remedies at Superfund sites, former mining areas, capped features and waste rock piles.

Reuse planning services Includes land use research, analysis and community engagement to identify potential future uses, develop a reuse concept plan or evaluate future use compatibility with the remedy.

Specific services include:

- Reuse Assessment to identify reasonably anticipated future land use (RAFLU) (industrial/commercial, residential, open space) for specific areas of the site to inform the remedial process.
- Reuse Plan that integrates community goals, site analysis, land use context and the remedy into a Future Use Framework (showing geographic-specific uses of the site) or Concept Plan (showing layout of potential future use features) to guide local planning, development and the remedial process.

For communities with environmental justice or equity concerns, services can be tailored to build capacity for nearby residents to participate in redevelopment planning and benefit from site redevelopment. Tools are available to help build shared understanding in situations of conflict, support community leaders in sharing their visions for reuse, and place community aspirations for reuse within the context of regional planning and investments.

Haul Roads and Rail Lines

Mining access roads, rail spurs and inactive local rail lines are another common set of features found at many mining sites. Internal haul roads — once used for moving and shipping materials around and off site — as well as abandoned railroad beds can be assets for future recreational trail use.

These types of inactive site features can serve as ready-made infrastructure for trail systems, reducing trail costs associated with clearing and grading. At rural mining areas, former graded access roads also offer an excellent opportunity to provide wheeled vehicle access to recreational activities throughout steeper terrain or remote areas.

CASE STUDY

St. Joe State Park
Park Hills, Missouri

Located in the southern part of the Big River Mine Tailings Site Response Area and close to the cities of Park Hills and Leadington, Missouri, St. Joe State Park encompasses over 8,000 acres.

For over 100 years, St. Joe Minerals Corp. mined lead within current park boundaries. In 1972, St. Joe Minerals Corp. ceased operations at the site and donated the land to the state in 1976. Recognizing the need for more recreational and ecological resources in the area, the Missouri Department of Natural Resources established St. Joe State Park later that year. The historic milling complex used by St. Joe Minerals Corp. still stands and has been designated as a Missouri Mines State Historic site. It now houses a rock and mineral museum and a gallery of mining equipment.

Today, St. Joe State Park offers area residents and visitors a variety of recreation opportunities. The park includes a popular riding area for off-road vehicle use, one of two in the state park system. The park has 54 miles of trails for off-road vehicle use, some of which traverse former mine tailing areas. Other recreation opportunities include camping, mountain biking, canoeing and kayaking, horseback riding and hiking.

Incentives

For rural areas throughout the region, recreational facilities, assets and opportunities can be major parts of local and regional economic development approaches. The U.S. Department of Agriculture (USDA) Rural Development Program is working to infuse rural areas with stronger businesses to empower rural America. This includes investing in outdoor recreation. Recent trends highlight that the number of U.S. participants in nature-based outdoor recreation activities increased 7.1% between 1999 and 2009. Activities like wildlife viewing and photographing nature are among the fastest growing recreation activities, and off-highway vehicle driving realized a 34% increase in participation. The report forecasts that interest in outdoor recreation will continue over the next 30 years.

USDA Rural Development Resources

Through economic development investments in planning and development of critical infrastructure, the USDA offers several key incentives to help advance opportunities for outdoor recreation and tourism.

Community Facilities Guaranteed Loan Program (RHS) Improve, develop, or finance essential community facilities for rural cities and towns with populations less than 50,000.

Eligible: Banks and credit unions, public bodies, community-based nonprofit corporations, federally-recognized Tribes.

Funding Range: $100,000-$5 million

Rural Business Development Grants (RBS) Targeted technical assistance, training and other activities leading to the development or expansion of small and emerging private businesses in rural areas. Feasibility studies or economic impact studies for a recreation activity may be eligible.

Eligible: Towns, state agencies, nonprofit corporations, authorities, federally-recognized Tribes, rural cooperatives.

Funding Range: $10,000-$500,000

Rural Cooperative Development Grant (RBS) Provide support to centers for cooperatives. Eligible work plans can include trail development/maintenance, feasibility studies, marketing, lodging development, business development, strategic planning.

Eligible: Nonprofit organizations, institutions of higher learning.

Funding Range: Maximum-$200,000

Business and Industry Guaranteed Loans (RBS) Targets business development and related purchases including land development, easements, rights-of-way, buildings, or facilities.

Eligible: Banks and credit unions, for-profit businesses, nonprofits, cooperatives, federally-recognized Tribes, public bodies, individuals.

Funding Range: $1 million-$25 million

Intermediary Relending Program (RBS) Provides 1% low-interest loans to local intermediaries that re-lend to businesses and for community development projects in rural communities.

Eligible: Nonprofits, cooperatives, federally-recognized Tribes, public agencies.

Funding Range: Up to $2 million for the first financing; $1 million at a time thereafter; total aggregate debt may not exceed $15 million.

Steps to Advance Recreation and Tourism Reuse

The following table outlines action steps for advancing and implementing recreational and tourism uses at mining and smelting sites.

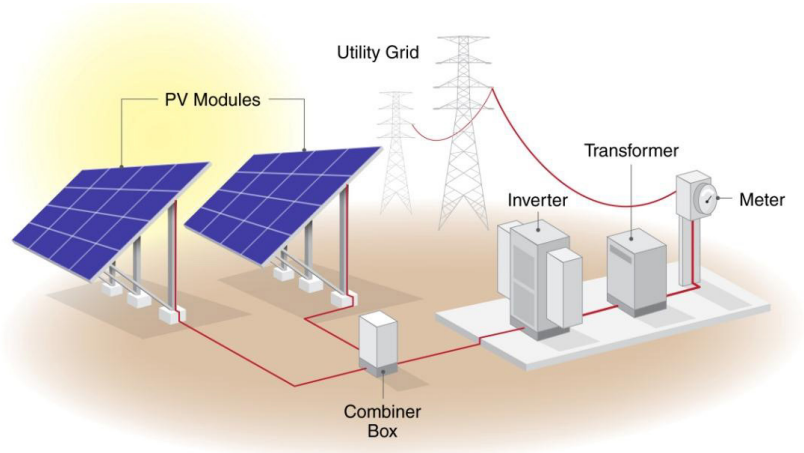
IMPLEMENTATION STEPS		POTENTIAL TOOLS AND ACTIONS TO ADVANCE STRATEGY
1	**Engage stakeholders/build partnerships**	▪ Engage EPA project manager, property owner, and municipal staff to evaluate recreation/open space needs. ▪ When assessing cleanup options, consult with municipal community development, planning, parks and recreation staff to identify park needs. ▪ EPA and local governments can benefit from holding regional recreation planning workshops to help align specific opportunities for sites, communities and strategies for the region as a whole.
2	**Assess suitability and opportunities**	▪ Coordinate with EPA project manager to identify site or area limitations, operation and maintenance (O&M) requirements and compatibility between remedy features and proposed use. ▪ Remediated tailings and capped areas offer opportunities. generally suitable for active recreation, sports fields, court sports, and parking. ▪ Haul roads and abandoned rail lines: opportunities for regional or local trail network.
3	**Develop funding strategy**	▪ Private landowners may consider conservation easements for converting former mining lands to recreation areas. ▪ Leverage federal and state recreation and rural economic development tourism grants to support planning and development.
4	**Implement/construct end use**	▪ Determine the types of structures needed for the planned reuse (e.g., bleachers, light poles). ▪ Determine whether and where cover penetrations will be allowed or should be avoided.
5	**Promote long-term stewardship**	▪ Ensure maintenance activities for engineered remedy features and recreation facilities are outlined in O&M plans and Environmental Covenants/Use Control Agreements.

Solar Renewable Energy Development

Overview

Renewable energy resources – wind, solar, biomass and geothermal energy – are non-polluting, inexhaustible and increasingly cost-competitive. Alternative energy resources support electricity generation, which offers a sustainable and potentially viable economic opportunity for landowners, municipalities, investors and other partners. Many Superfund sites can be well suited for alternative energy production. Sites located in already developed areas near utilities and transportation networks can help keep development costs low. This fact sheet focuses on the development of solar renewable energy projects at Superfund sites and provides basic background information on solar power, describes the steps and key factors that determine if solar power generation is feasible at a site, and highlights successful solar projects. Additional information on how to access technical support and links to implementation resources are included as well.

Benefits of Solar Renewable Energy



Solar energy is the conversion of the sun's rays into electricity. Solar energy can be used in a variety of ways to produce heat, light, fuel, or electricity. All regions of the United States have some solar resources available for power production. Superfund sites offer solar renewable energy development, which:

- Reduces reliance on non-renewable energy resources and helps to offset greenhouse gas emissions.
- Provides electricity cost savings for landowners and facilities, communities, private site owners, and consumers with millions of dollars in savings through lower energy costs.
- Creates construction jobs.
- Generates new property tax revenue as a result of reusing these sites for renewable energy.

Incentives: Policy Tools and Financial Incentives for Solar Development

Typical incentives, as well as key factors to consider when evaluating suitable sites and locations for solar are summarized below.

Policies and Incentives

Solar energy development incentives include both policy requirements and financial incentives.

Renewable Energy Portfolio Standards

Renewable portfolio standards (RPSs) are state policies that have created markets favorable for solar and other forms of renewable energy deployment.

RPSs are state policies that require retail electric providers to generate or purchase a certain amount of electricity from renewable sources (solar, wind, biomass, geothermal). Twenty-nine states nationwide have an RPS. State RPSs typically include "carve out" provisions that mandate a certain percentage of electricity generated comes from a particular technology (e.g., solar or biomass). As of October 2021, Missouri has a mandated RPS requirement, Iowa and Kansas have expired RPS measures, while Nebraska does not have a RPS requirement for utilities.

Financial Incentives

Financial incentives for solar include tax credits, rebates, utility rate structures and cash incentives provided through electric utilities, municipal programs, as well as state and federal governments. For solar, developers and private parties rely on the federal investment tax credit to make projects financially viable. Other state and utility-based incentives may also be used to help fund a solar project, including:

- Federal investment tax credit (ITC)
- Federal renewable energy production incentives (REPIs)
- State tax incentives and rebates
- State or utility cash incentives and rebates
- Solar renewable energy certificates (SRECs)
- State or utility cash incentives and rebates
- Net metering (banking excess electricity production for future credit) private parties
- Accelerated depreciation under the federal Modified Accelerated Cost Recovery System (MACRS)
- Systems benefit charge (SBC) funds

CASE STUDY

Community Solar Farm
Oronogo-Duenweg Mining Belt, Southwest Missouri

At the Oronogo-Duenweg Mining Belt site, EPA has cleaned up about 2,500 residential properties, and excavated mine waste from 4,500 acres around Joplin, Missouri. Cleanup activities have resulted in about 4,000 acres that are ready for reuse.

In 2021, a 60-acre part of the site located in the community of Prosperity became home to southwest Missouri's first solar renewable energy generation facility. Liberty Utilities developed a 2.25 megawatt (MW) solar project at a remediated former mine waste area. The solar panels will be able to generate enough electricity to power 400 homes if the pilot is successful.

Liberty has developed the solar farm based on a community solar model. Customers sign up for Liberty's Solar Subscription program and purchase blocks of solar power at a fixed rate over a period of time. This innovative approach allows a wide range of potential customers to invest in renewable energy without installing the panels or necessarily owning the property. The subscription program is open for both residential and commercial customers. Liberty has plans in place to develop several other 2 to 5 MW solar projects, with a goal of generating about 30 MW in the southwest Missouri region.

CASE STUDY

Reilly Tar & Chemical
Indianapolis, Indiana

Maywood Solar Farm is built on top of a former landfill at an old industrial property. The 10.8-megawatt facility includes over 36,000 ground-mounted, fixed-tilt solar panels.

Technological advances in panel mounting and framing systems made the project possible; the facility's solar panel systems have minimal impact on the integrity of landfill covers and avoid placement of undue weight on landfilled areas. Project developers used a driven pile-based solar module mounting system rather than the concrete ballast system commonly used at landfills.

The driven pile system provides stability for the solar panels and framing while avoiding soil excavation or adding weight. The only excavations were for utility poles to transfer power off site to the electrical grid. In total, soil movement was reduced by an estimated 93% over conventional solar construction methods.

In total, contractors installed several thousand piles. In the few places where piles could not be driven to proper depth to achieve engineering goals, the design used poured-form ballast-support systems, enabled by the selected adaptive racking system. The project also included an innovative wire management approach; use of aboveground cable trays enabled the project to avoid digging trenches between each row of panels and burying wire below ground. These design choices helped minimize soil cover disruption during construction.

CASE STUDY

Chevron Questa Mine
Questa, New Mexico

Molybdenum mining and related activities began at the site in 1920. Years of open-pit mining resulted in over a million tons of waste rock around the open-pit area. Seepage and surface water runoff over mining waste piles contaminated area groundwater and soils. Chevron, the potentially responsible party, coordinated with EPA and state agencies during cleanup planning, enabling construction of a 1-megawatt concentrated photovoltaic solar facility over 20 acres of the site. The 175-panel facility has been operating since April 2011. Today, it is the largest facility of its kind in the United States. A local energy cooperative purchases the energy through a 20-year purchase agreement. The solar facility generates enough electricity to power about 300 homes. For more information, check out EPA's in-depth case study: New Energies: Utility-Scale Solar on a Tailing Disposal Facility. For more information visit semspub.epa.gov/work/06/300190.pdf.

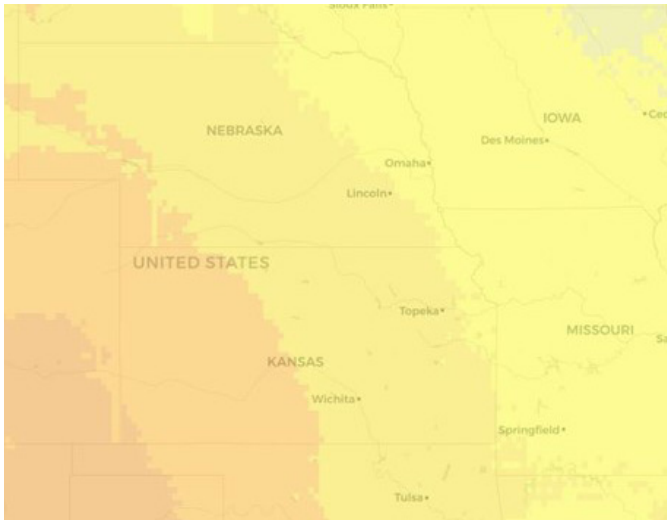
Best Practices

Identifying Sites and Suitability for Solar

When assessing the potential for solar renewable energy development at a site, a set of standard evaluation processes are employed. These include assessments of location/solar resource, site suitability, and financial feasibility.

Location and Solar Resource Availability

Selecting a site that is favorable for a solar project involves an evaluation of the solar resource available in your state or region. Because solar radiation varies across the country, areas in the southern and western United States tend to have more sunlight and stronger solar radiation for more of the year than areas in the north and east. Solar radiation levels of 4.5 and greater are considered suitable for solar renewable energy generation. U.S. Department of Energy's National Renewable Energy Lab provides interactive maps that show how much solar radiation is available at locations nationwide: www.nrel.gov/gis/solar.html



Site Selection Criteria

In addition to the location's solar resources, the following typical physical, site and real estate factors need to be evaluated.

Acreage

Determine land area that may be suitable and available (capped areas, landfills, other level areas). Typically, solar arrays are sited on generally level open ground or on rooftop structures. While solar projects can be suitable at most sites, landowners can benefit from locating areas greater than 20 acres.

Distance to electric transmission lines

In most situations, electricity generated from solar projects is distributed directly to electrical transmission grids. Availability of electric utility connections at the site and distance to power substations needs to be documented early. Solar developers typically work with utilities to determine if and when transmission lines have capacity for additional power distribution near the proposed solar project location.

Distance to graded roads

Vehicle access to available acreage is necessary for installation of solar panels. Look for sites where graded road access is readily available.

Site slope and aspect

Solar panels require generally level land that faces south; areas with steep slopes and large grade changes present challenges for system installation and operation.

Solar Siting Best Practices for Capped Sites

When siting solar photovoltaic infrastructure on capped areas, consider the following factors:

- Cover characteristics/weight limitations
- Landfill cover penetration restrictions
- Vegetative cover management/mitigating erosion impacts
- Anchoring system selection and design
- Construction and solar system weight considerations
- Snow/wind loading requirements
- Compatibility with institutional controls
- On-site utility requirements

Biomass feedstocks

Wind turbines

Solar photovoltaic (PV) panels

Technical Assistance Resource: Renewable Energy Reuse Assessments and Pre-Feasibility Studies

EPA's Superfund Redevelopment Program provides technical assistance resources to help landowners, local governments and communities evaluate renewable energy feasibility.

Superfund Redevelopment and EPA regions have provided renewable energy assessment services at about 40 sites nationwide. Solar assessment and activities typically include one or more of the steps below.

Resource Screening

Through review of resource availability data provided by the U.S. Department of Energy and the National Renewable Energy Laboratory, resource screenings help identify the renewable energy sources best suited to a particular site. Typical resource screenings include evaluations of solar, wind and biomass resources.

Site Suitability Analysis

Mapping and analysis of a site's physical features, existing or planned remedial components, ownership, infrastructure, and surrounding land use considerations provide a next level of analysis. The site suitability analysis integrates site remedy compatibility and renewable energy technology considerations into reuse suitability maps to help site owners, solar developers, potentially responsible parties and regulatory agencies reach agreement on portions of a site that may be suitable for on-site renewable energy generation.

Preliminary Financial Assessment

The costs of construction, operation, and maintenance along with the revenue from selling electricity and available tax incentives are also key factors in determining whether a solar project may be feasible. Solar energy financial assessments are a tool to help site owners and municipalities understand the financial impacts and limitations for a solar project's size, ownership, and development options.

Implementation Steps to Promote Solar Reuse at Mining Sites

The following table highlights steps to incentivize solar reuse at mining sites. Implementation steps in the left-hand column provide an organizational structure to help landowners and EPA site teams address site compatibility and potential for solar renewable energy use.

IMPLEMENTATION STEPS		POTENTIAL TOOLS AND ACTIONS TO ADVANCE STRATEGY
1	**Engage stakeholders/build partnerships**	▪ Landowners, potentially responsible parties, municipal programs and electrical utilities are key stakeholders to involve early on in assessing renewable energy potential.
2	**Assess suitability and opportunities**	▪ Assess solar resource availability. Verify solar radiation levels in location are at least 4-4.5 kW/m^2/day. ▪ Identify site areas close to transmission lines with road access and level areas that are more than 20 acres in size. ▪ Coordination among EPA managers and property owners is essential. Focus on delineating solar project area, verifying limitations, restrictions and site O&M requirements.
3	**Develop funding strategy**	▪ Consider engaging solar developers once potential project footprint or locations are identified. Renewable energy developers should have experience obtaining financing, raising funds and facilitating solar project design and construction. ▪ Typical solar projects are funded through a mix of federal tax incentives, utility incentives, programs and private investment sources.
4	**Implement/construct end use**	▪ Ensure solar panel rack and mounting system design is coordinated and compatible with site O&M plans. ▪ Consider solar installers with experience siting projects on landfills and capped areas. ▪ Dispose of any contaminated material that may be generated during construction. Remedial project managers can provide assistance identifying proper disposal practices and locations at their sites.
5	**Promote long-term stewardship**	▪ Solar photovoltaic systems are typically designed and maintained to be in sync with power purchase agreements for 20-30 years. Ensure plans for system dismantling are in place and compatible with site O&M requirements.

Commercial Reuse

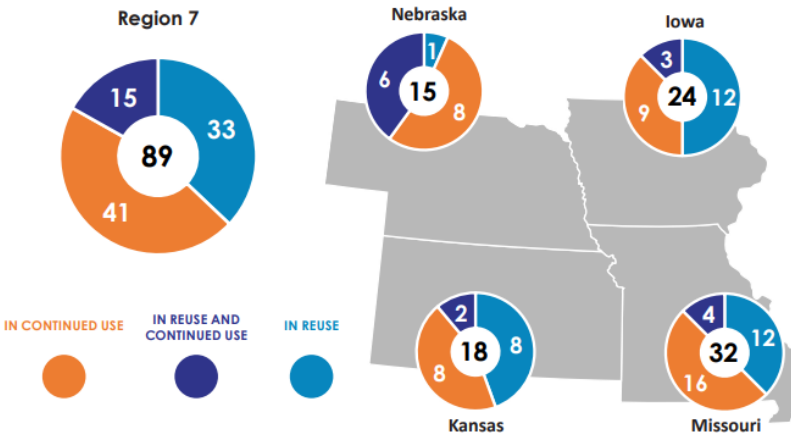
Overview

Commercial uses include a diverse range of use types encompassing business enterprises from commercial office and professional services firms, to manufacturing facilities, to local shopping and auto repair services.

Commercial reuse and redevelopment is underway at more than 35 Superfund sites in Region 7, and of those, four are lead mining sites that support more than 1,600 commercial businesses.

Region 7 Mining Sites Commercial Reuse	
Mining Sites with Commercial Reuse	4
Total Businesses at Mining Sites	1,626

Region 7 Superfund sites provide an estimated 35,690 jobs and contribute an estimated $1.9 billion in annual employment income.



Best Practices

Capping for Commercial Reuse Development

Capped areas are often part of complex systems. Detailed planning and analysis is needed to make sure reuses and remedies are compatible. Capped sites can support structures, parks and recreation, agriculture, and renewable energy sources. Examples of common reuse options are described below along with accompanying case studies that highlight successful examples from around the region.

Commercial Reuse Considerations

Utilities: It is important to consider where building sites and utilities will need to be placed in order to create clean corridors and building sites without having to disturb the cap. Include special design approaches for utilities to be placed in trenches and wrapped with geotextile to minimize settlement damage.

Structures: Buildings or structures should be lightweight with spread footings and include methane venting, vapor intrusion prevention and monitoring systems. Also determine the types of structures needed for the planned reuse and take steps to prevent breaches in the cover system and make sure all necessary land controls are in place. Be mindful that the design of the structures should examine ground settlement and long-term maintenance costs. Capped sites are often well suited for commercial businesses.

Site Drainage: Site capping can significantly increase runoff and the need for stormwater controls. The on-site containment of wastes can be compatible with a variety of durable covers, such as concrete slab foundations or asphalt paved areas. Surface drainage must be directed away from steep slopes or collected. To avoid underground piping, which may cause problems with gas collection and settlement, storm drainage should be handled, where possible, on the surface with swales and open channels. To promote proper drainage, consider the slope required by environmental regulators and for the planned reuse.

Leveraging Redevelopment Incentives for Community Revitalization

Opportunity Zones in Region 7 Overlay

Opportunity Zones are a powerful way to encourage revitalization in economically distressed communities. Redevelopment of current or former Superfund sites may qualify for Opportunity Zone tax benefits.

Opportunity Zones (OZs) were created by the 2017 Tax Cuts and Jobs Act. About 8,756 OZs were established in all 50 states, the District of Columbia and the five U.S. territories. For communities, OZs can help revitalize contaminated and formerly contaminated properties, including Superfund sites. They attract private investment and strengthen the financial viability of redevelopment projects.

Many communities are using OZs to attract investors and developers. Qualified investments in an OZ offer tax benefits such as temporary deferral of capital gains, and tax-free gains after 10 years. Investors and communities can work together to help direct investment resources to specific projects that meet community needs. The presence of sites that are available for reuse and development in an OZ can be valuable to property owners, businesses or investors looking to take advantage of tax incentives.

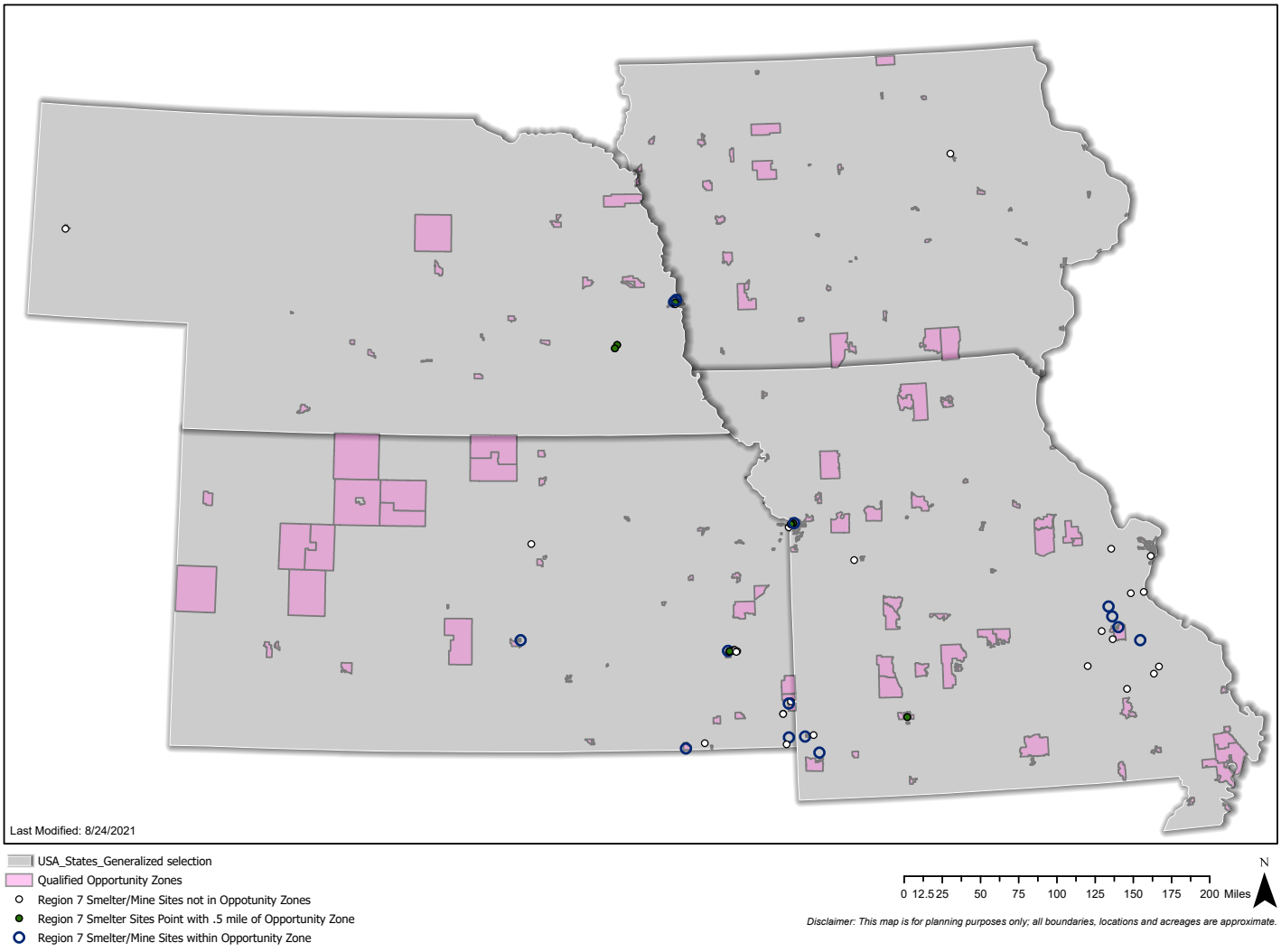
Many communities are using OZs to attract investors and developers. The U.S. Department of Housing and Urban Development (HUD) and the EPA have tools and resources to help local leaders achieve equitable outcomes at OZ development projects.

For more information, see the Superfund Site Redevelopment: Using Opportunity Zone Tax Incentives Guide.

Communities can leverage investment dollars to foster community revitalization projects, such as redeveloping properties for community benefit, improving infrastructure, or rehabilitating key structures. The U.S. Department of Housing and Urban Development (HUD) and the EPA have tools and resources to help local leaders achieve equitable outcomes at OZ development projects.

Opportunity Zones at Region 7 Mining and Smelting Sites

The Region 7 states of Iowa, Missouri, Nebraska and Kansas encompass 341 federally qualified Opportunity Zones. These census tract delineations of underserved low-income communities in the Region provides a focus to help facilitate revitalization. The analysis summarized below evaluated the number of lead mining and smelting sites in Region 7 that are located within federally qualified Opportunity Zones (OZ). The information is presented in tables below with a regional overview and several examples of site boundaries that include opportunity zones.

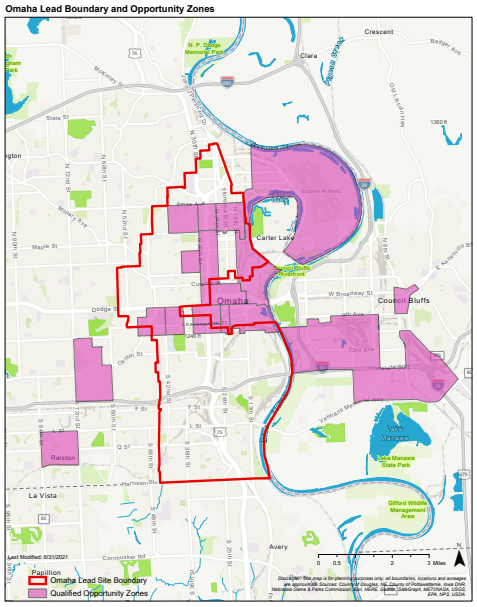


Region 7 Mining and Smelting Sites and Opportunity Zones.

Analysis of available site boundaries and OZs identified that at least 9 mining or smelting sites in Region 7 fall within an OZ. The overlap between a site boundary and an OZ does not necessarily have direct implications for Superfund cleanups but can help to guide reuse and revitalization approaches for these underserved communities.

Sites Located in an Opportunity Zone

KSN000705026	FORMER UNITED ZINC & ASSOCIATED SMELTERS
KSD980741862	CHEROKEE COUNTY
MOD980686281	ORONOGO-DUENWEG MINING BELT
MOD981126899	BIG RIVER MINE TAILINGS/ST. JOE MINERALS CORP.
MON000705023	WASHINGTON COUNTY LEAD DISTRICT - POTOSI
MON000705027	WASHINGTON COUNTY LEAD DISTRICT - OLD MINES
NESFN0703481	OMAHA LEAD
MON000705032	WASHINGTON COUNTY LEAD DISTRICT - RICHWOODS
MOD981507585	NEWTON COUNTY MINE TAILINGS



The Omaha Lead Site boundary and opportunity zones.

An additional 9 sites, primarily lead or smelter sites, are located within ½-mile of an OZ. Site boundaries were not available for these sites, therefore it was not possible to confirm whether areas within the relevant site boundaries overlapped with an OZ. The ½-mile proximity analysis used EPA's established geographic coordinates associated with a facility or part of the site to identify each site's location, then established a ½-mile radius around that point.

Sites Located within 1/2-Mile of an Opportunity Zone

KS0000102129	EAST IOLA SMELTER
NEN000702787	FORMER NORTHWESTERN METAL 27TH STREET
NEN000704908	FORMER OMAHA WHITE LEAD
KSN000705026	FORMER UNITED ZINC & ASSOCIATED SMELTERS
NEN000706447	NORTHWESTERN METAL CO.
MON000705027	OZARK CIRCUITS
MON000706445	PRICE METAL REFINING
MON000706450	SHOSTAK METAL
MON000706453	STUDER CONTAINER SERVICE

The East Iola Smelter Site is within ½ Mile of an Opportunity Zone

CASE STUDY

Oronogo-Duenweg Mining Belt
Joplin, Missouri

Mining, milling and smelting of lead and zinc ores at the site began in the 1850s and continued in some site areas until the 1970s. Smelting operations dispersed airborne contaminants, resulting in the contamination of site groundwater, surface water, and soil with metals, including lead. EPA conducted a time-critical removal action to address high blood lead levels in local children. EPA cleaned up about 2,500 residential properties and agricultural lands in surrounding communities. The city of Joplin cleaned up lead-contaminated soil at an additional 443 residences. Additional work included connecting 350 homes to public water supplies, excavating mine waste from 4,500 acres of contaminated land, and the construction of wetlands.

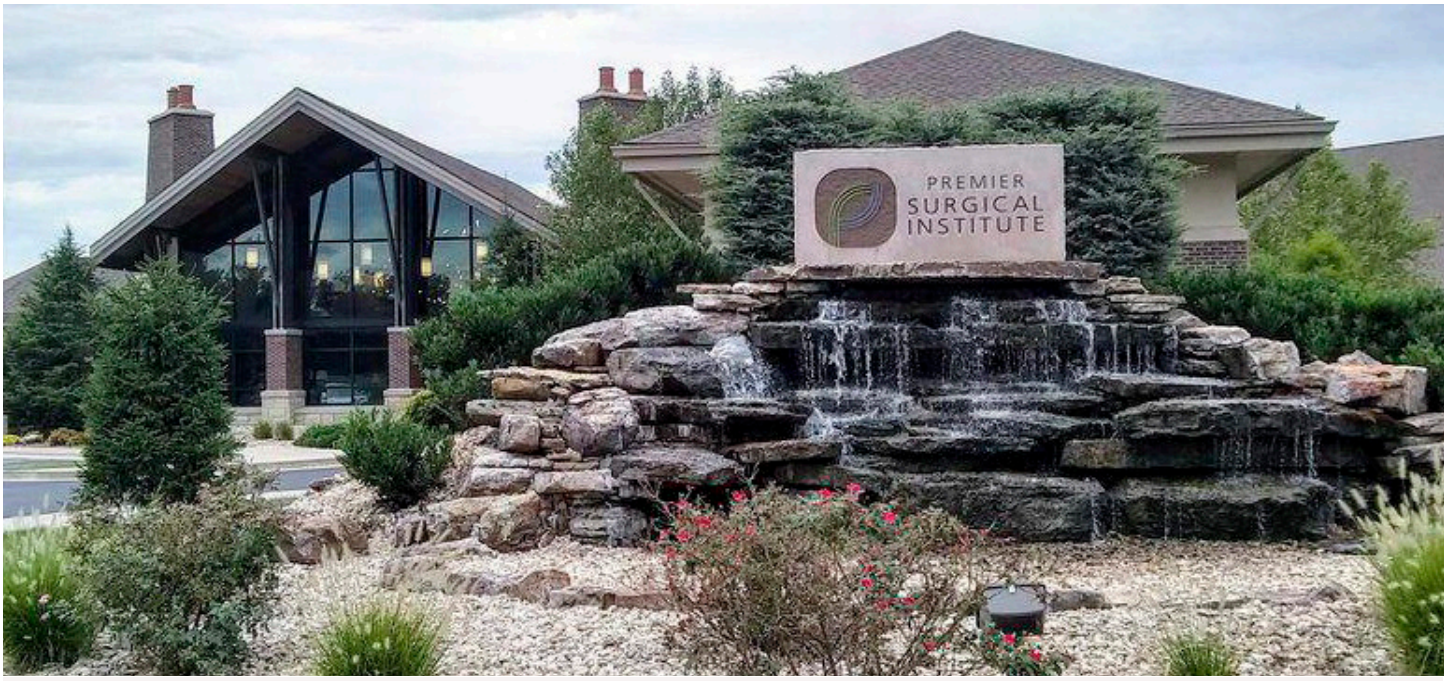
Through the efforts of EPA, the state of Missouri and the community, the site is in productive reuse. Residential and agricultural land uses continue. Through a Prospective Purchaser Agreement with EPA, a scrap metal recycler bought and cleaned up 40 acres of the site prior to building its facility. The Missouri Highway and Transportation Department developed the Route 249 Development Plan that contains details on zoning, land use and institutional controls to facilitate sustainable development, while protecting human health. Today, additional reuse planning is underway and over 4,000 acres of cleaned-up land are ready for redevelopment.

CASE STUDY

Park Hills Industrial Park, Big River Mine Tailings Site

Park Hills, a centrally located city in St. Francois County with 8,655 residents, is the location of the Big River Mine tailings pile, which was owned by the Doe Run Company. Following the site's listing on the National Priorities List in 1992, the Doe Run Company worked to remediate and stabilize the area. After remediation and stabilization work, the Doe Run Company donated the property to the Park Hills Chamber of Commerce in 1993. To help offset job losses from mine closures in the area, the Chamber of Commerce decided to turn the land into an industrial park. To do this, the Chamber of Commerce worked with the city of Park Hills to establish a tax-increment financing (TIF) district, in an area now called Park Hills Industrial Park, as an incentive for businesses to locate in the area.

The Chamber of Commerce also worked with the city to subdivide the land into 27 parcels to facilitate land sales. In 1994, the Piramal Glass Factory was the first company to locate on site, on a large parcel in the southwest part of the park. Currently, 12 businesses and organizations are located in Park Hills Industrial Park. In total, they provide 953 jobs and over $52 million in estimated annual employee income. In 2017, they generated over $163 million in annual sales. The Chamber of Commerce continues to market remaining parcels.



CASE STUDY

Premier Surgical Institute
Cherokee County, Kansas

For over 100 years, widespread lead and zinc mining took place in Cherokee County, Kansas, which created piles of mine waste and tailings covering more than 4,000 acres. These mine tailings contaminated soil and groundwater with lead, zinc and cadmium. EPA, the Kansas Department of Health and Environment, responsible parties, local governments, and property owners worked together to clean up the site, while preserving its continued use and supporting redevelopment. By transforming thousands of mine-scarred acres into a pastoral landscape of clean yards and safe drinking water, the site's cleanup is directly and indirectly enhancing the economic vitality of the county and region.

Today, the area supports a wide range of new and continued agricultural, recreational, ecological, commercial, public service and residential uses. In 1995, EPA finished cleaning up 857 acres of the site in Galena and removed over 2.1 million cubic yards of mine waste. After cleanup, a portion of the area was redeveloped as a medical complex. Premier Surgical Institute, which opened in 2013, provides inpatient and outpatient surgery, imaging and other wellness services. In 2018, Premier Surgical generated nearly $9 million in annual sales revenue and provided almost $7 million in estimated employee income. By enhancing the economic vitality of the area, the site's cleanup will indirectly support the continued strength of the area's community assets.

Incentives

Businesses and commercial property developers can often take advantage of many different types of incentives. Economic development zones, direct business assistance, and tax credits are among the most commonly used incentives in commercial reuse projects. These are explained below.

Opportunity Zones

Opportunity Zones (OZs) attract long-term private investors and stimulate economic growth. OZs are a powerful way to encourage revitalization in economically distressed communities. Superfund site property in an OZ qualifies for tax benefits when the qualifying investment commences an "original use" on the property or "substantially improves" the property (doubles the basis in the property) in a specified timeframe. U.S. taxpayers are eligible to receive tax benefits on realized capital gains reinvested in OZs through qualified opportunity funds, including temporary deferral of capital gains taxes, step up in basis, and tax-free gains after year 10. Many communities are using OZs to attract investors and developers.

Enterprise Zones

Enterprise Zones are specifically designated areas that are granted incentives in order to encourage private economic development and job creation. Usually, they are used to promote community revitalization in neighborhoods that have experienced decline in essential businesses or quality housing.

Infrastructure and Business Assistance: USDA Rural Development

Rural Development's mission is to increase economic opportunity and improve the quality of life for all rural Americans. That mission touches every facet of rural America throughout the country. Rural development has more than 40 loan, grant and technical assistance programs to create opportunities in housing, business, and infrastructure, including Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), Rural Utilities Service (RUS) and Rural Development Innovation Center (IC). Rural development serves as a catalyst to improve conditions in rural America by increasing the flow of capital through leveraged partnerships that help make prosperity and better living a reality in rural America.

USDA Infrastructure Grants

Rural development is an agency that continues to create job opportunities in rural America through investments in rural businesses and cooperatives. Rural development provides loans, grants and loan guarantees to support reliable and necessary services such as water, energy, housing, broadband, schools and hospitals. Collectively, these investments support families that call rural areas home and leverages the strengths of rural areas, building new markets and expanding investment opportunities that create prosperous, sustainable communities.

Superfund Site Redevelopment: Opportunity Zones

Opportunity Zones are a powerful way to encourage revitalization in economically distressed communities. Redevelopment of current or former Superfund sites may qualify for Opportunity Zone tax benefits.

Opportunity Zones (OZs) were created by the 2017 Tax Cuts and Jobs Act. About 8,756 OZs were established in all 50 states, the District of Columbia and the five U.S. territories. For communities, OZs can help revitalize contaminated and formerly contaminated properties, including Superfund sites. They attract private investment and strengthen the financial viability of redevelopment projects.

Opportunity Zone Tax Benefits:

- Temporary deferral of capital gains taxes
- Step up in basis
- Tax-free gains after year 10

Implementation Steps to Promote Commercial Reuse at Mining Sites

The following table highlights steps to incentivize commercial reuse at mining sites. Implementation steps in the left-hand column provide an organizational structure to help landowners and EPA site teams address site compatibility and potential for reuse.

IMPLEMENTATION STEPS		POTENTIAL TOOLS AND ACTIONS TO ADVANCE STRATEGY
1	**Integrate remedy and reuse**	▪ Planning for reuse before a remedy and cap(s) have been designed optimizes opportunities for shared infrastructure, tailored features and cost savings over the short and long term. ▪ For sites where a remedy is already in place, engineering assessments can determine whether the area can physically support the planned reuse.
2	**Leverage community engagement and local governments**	▪ Projects that enjoy broad community support can lead to new partnerships, are more likely to get built and provide opportunities to share information and address local health concerns and related issues. Seeking community input and involvement can also maximize project effectiveness. ▪ Local governments are particularly well-positioned to host redevelopment projects, bring together diverse stakeholders, and use planning tools and incentives to foster reuse outcomes.
3	**Consider phasing uses and technical requirements**	▪ As landfills and other capped areas stabilize and maintenance requirements step down, the range of reuse options can increase. ▪ These projects are often complex undertakings requiring legal, technical, financial and policy expertise. Partnerships and tools such as power purchase agreements help make sure that these complexities need not deter interest in reuse projects at capped sites.
4	**Address institutional controls as part of the remedy**	▪ Seeking community input and involvement can maximize project effectiveness. ▪ These land use controls protect human health and guide redevelopment activities by providing detailed guidance, can be flexible and responsive to reflect different reuses, and can be monitored and managed by local governments over time.
5	**Build on past experience**	▪ The Superfund remedial process can provide information to fulfill environmental permitting and other regulatory requirements for a range of reuse projects at capped sites.

Ecological Revitalization

Overview

Ecological revitalization is the process of returning a contaminated site to a natural environment, similar to what existed before the property was developed.

The purpose of ecological revitalization is to provide an environment where both plants and animals can thrive. Mining or metal and mineral ore processing facilities can displace the plants and animals living there and disrupt the ecology (the ways these organisms interact with each other and their environment). Returning a meadow, forest, or wetlands from mining or industrial properties can restore the habitats and other natural characteristics of the area.

Benefits

Returning contaminated sites to beneficial use can:

- Lead to increased property values, recreational centers, and protected open space in what are often densely developed areas.
- Reclaim lost land and transform an eyesore into an attractive environmental resource for the community.
- Isolate or remove contamination from people and wildlife and can also reduce soil erosion.
- Create wildlife habitats, improve air and water quality, and provide added green space for parks, recreation, and nature preserves.

Best Practices

Aligning Site Features and Ecological Processes and Economies

Grazing land reclamation, wildlife habitat restoration, and fish and game habitat are several increasingly viable reuse options for mining sites. Examples of these are described below along with accompanying case studies that highlight successful examples from around the region.

CASE STUDY

Cherokee County Superfund Site

Located in southeast Kansas, the Cherokee County site is part of a lead and zinc mining region known as the Tri-State Mining Area, as it spans portions of Kansas, Missouri and Oklahoma. One hundred years of lead and zinc mining left the land strewn with contaminated debris and soil that caused contamination of area groundwater. EPA added the site to the Superfund program's National Priorities List (NPL) in 1983. Now, native grasses, streams and wildlife have replaced barren rock and gravel throughout a 25-square mile portion of the site. In 1993, after ensuring that area residents with private wells had safe drinking water, EPA gathered surface mine wastes and buried them on site. Workers covered land with clean soil, diverted streams to avoid the stored wastes and planted the entire site with native vegetation. In 2009, the site received $14.5 million in American Reinvestment and Recovery Act (ARRA) funds, which EPA leveraged to support cleanup activities at the Badger, Lawton, Baxter Springs and Treece sub-sites. The ARRA funding will enable EPA to complete the project in fewer years than originally anticipated. Restoration efforts continue. Cleanup of this site has restored the delicate natural environment and reduced human health risks from contamination.

Common Steps

Ecological revitalization is most successful when considered during site cleanup. Examples of ecological revitalization activities undertaken during cleanups are outlined below.

- Demolition or stabilization of buildings and other infrastructure.
- Regrading the ground surface to remove or create slopes.
- Bringing in fertile soil or adding nutrients and other natural materials, also known as "amendments," to existing soil to help plants grow.
- Creating or restoring wetlands and natural stream channels.
- Planting native trees, grasses, and other vegetation.
- Reestablishing wildlife.

Pollinator Habitat

Expanding and protecting vegetation and habitat for bees is an increasingly important opportunity. According to the Pollinator Partnership, domestic honeybees pollinate approximately $10 billion worth of crops in the United States each year. In Region 7, restoration of pollinator prairies is an exciting opportunity. Landowners and communities are helping to expand valuable pollinator habitat.

A pollinator prairie, garden or preserve is ecological habitat consisting of native plants that provide pollinators – bees, birds, butterflies – with sources of food, shelter, and safe areas for breeding.

Pollinator habitats support many different kinds of pollinators, including bees, beetles, flies, butterflies, moths and hummingbirds. Habitat gardens like the one pictured below also provide more than a home for pollinators. They filter rainwater, provide a home for other wildlife, prevent invasive species from taking over, support our agricultural systems and provide people with a beautiful space to learn and enjoy nature.

Native Plants for the Tallgrass Prairie

Prairie grass and wildflower areas can be designed as mixed vegetation types to represent the "tall grass prairie" native grassland habitats of eastern Kansas, Nebraska and western Missouri. Below are landscape characteristics and common species native to the tallgrass prairie.

- Intermingled dry and moist prairies, groves, and strips of deciduous trees.
- Prairies dominated by moderately tall grass species (bluestem, switchgrass, and Indian grass).
- Trees found near streams and on north-facing slopes in the west, on hilltops in the east.
- Dominant trees are oak and hickory.

CASE STUDY

Chemical Commodities, Inc. Site Olathe, Kansas

The 1.5-acre Chemical Commodities, Inc. (CCI) Superfund Site is in Olathe, Kansas. CCI, a chemical brokerage facility, operated at the facility from 1951 to 1989 and conducted recycling activities that often spilled or leaked hazardous chemicals. EPA added the site to the National Priorities List (NPL) in 1994. Cleanup activities included removing and disposing of contaminated soil, putting land use controls in place, treating groundwater contamination, and maintaining vapor control systems.

The potentially responsible parties worked with EPA and other organizations to develop the Olathe Pollinator Prairie on site. The prairie is a walk-through educational natural habitat for Monarch butterflies and other pollinators. Two outreach programs, Monarch Watch and the Pollinator Partnership, are part of the effort. Both programs work on education, research and conservation. Other groups also helped develop the habitat. Monarch Joint Venture - a partnership of federal and state agencies, non-governmental organizations, and academic programs - supports efforts to protect the Monarch migration across the United States. Wildlife Habitat Council is a group dedicated to restoring wildlife habitat, protecting biodiversity and educating communities. The CCI Community Advisory Group also supported community priorities and interests in site cleanup and reuse.

The Olathe Pollinator Prairie opened in October 2012. It includes habitat for birds, bees and butterflies, a tagging station for migrating butterflies, and information kiosks along a walking trail.

Today, the site provides a beautiful landscape for the surrounding neighborhood and offers education opportunities for the community to learn about the importance of pollination. The site is capped with a soil cover constructed to prevent exposure to contaminated soils in the subsurface. The potentially responsible party's contractor mows the site (except for the garden area) every two weeks and addresses any issues as needed. Signs are in place in the pollinator habitat to direct gardeners to the contractors prior to completing any gardening.

Agricultural Uses

The revitalization of contaminated lands is now widespread, with sites being returned to a broad range of land uses to meet multiple community needs. As of 2020, there are over 550 Superfund sites in actual or planned use, including more than 210 sites in agricultural, ecological or recreational uses. There are 95 EPA sites nationwide in agricultural reuse or continued use, including 20 sites in Region 7.

About 20% of the country's land is dedicated to growing crops in the United States, and another 587 million acres (26%) is in pasture and range, largely used for domestic livestock production. While these farming activities remain the core of American agriculture, agricultural land uses also continue to diversify; recent trends include value-added farm products, organic agriculture, niche farming, alternative energy production, and an emphasis on community food systems and food security. Agricultural land uses at Superfund sites reflect these dynamics. Activities at many of these sites are farming operations like grazing and cropland, while other sites host agricultural land uses that transform waste into energy and sustain local food systems. Future agricultural possibilities at these sites could play a role in addressing national and global priorities like climate change. Additionally, at many mining and lead sites, such as those throughout Region 7, ecological remediation approaches are increasingly using crops and soil science to address site contamination and protect public health and the environment.

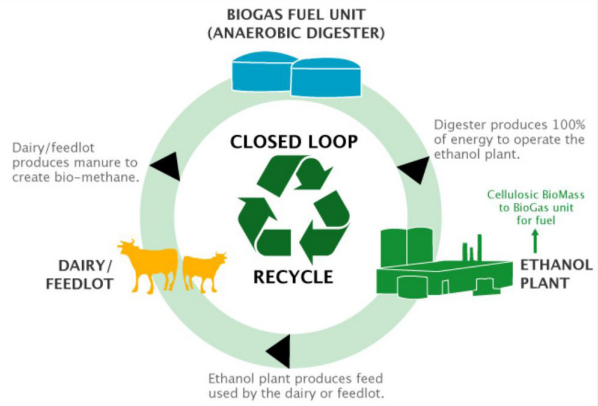
At sites where remedies have not yet been selected, it may also be possible for plant-based agricultural land uses, including sustainable forest management, to serve as part of a site's remedy. Phytoremediation techniques rely on plants and trees like poplars and willows to remove contaminants, particularly metals and organic compounds, from site soils. Phytoremediation works optimally when plant or tree roots reach the depth of soil contamination.

Energy and Food Crops

Crops grown for energy could be produced in large quantities, just as food crops are. While corn is currently the most widely used energy crop, native trees and grasses are likely to become the most popular in the future. These perennial crops require less maintenance and fewer inputs than do annual row crops, so they are cheaper and more sustainable to produce.

Waste recycling is a key component of industrial ecology, an interdisciplinary field that focuses on sustainably integrating natural resources with the economy and technology. In agriculture, this translates into developing new uses for waste products, like manure and crop residues. In recent decades, agricultural waste products have proven to be particularly well suited for alternative energy generation. A former munitions plant in Nebraska illustrates that rural Superfund sites can be well suited to waste recycling and alternative energy opportunities. The agricultural research facilities at the site also highlight how some sites can support multiple agricultural land uses.

CASE STUDY



Nebraska Ordnance Plant

The Nebraska Ordnance Plant is a Superfund site located in eastern Nebraska. A former army munitions production plant, portions of the plant were sold to various entities beginning in 1962. At the time, addressing potentially unexploded ordnance was the primary concern. Once the site was added to EPA's National Priorities List in 1989, site contaminants, including polychlorinated biphenyls (PCBs), volatile organic compounds and explosives residues were addressed. Today, portions of the 17,000-acre area are the focus of several innovative agricultural efforts, including waste recycling, alternative energy generation and agricultural research. Portions of the site host a wind farm, which enables dual uses of the same property -- renewable energy generation and agricultural operations. Based on these innovative uses, the facility has been recognized as part of EPA's Environmentally Responsible Redevelopment and Reuse (ER3) Initiative, which is designed to promote the sustainable redevelopment or reuse of formerly contaminated sites.

Incentives

Policies and incentives supporting agricultural development currently available through the USDA are provided below.

USDA Farm Services Agency Agriculture Loans

Guaranteed Loan, Direct Operating and Direct Farm Ownership Loans. Visit Lender Toolkit for more information: https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/guaranteed-farm-loans/guaranteed-loans-lender-toolkit/index

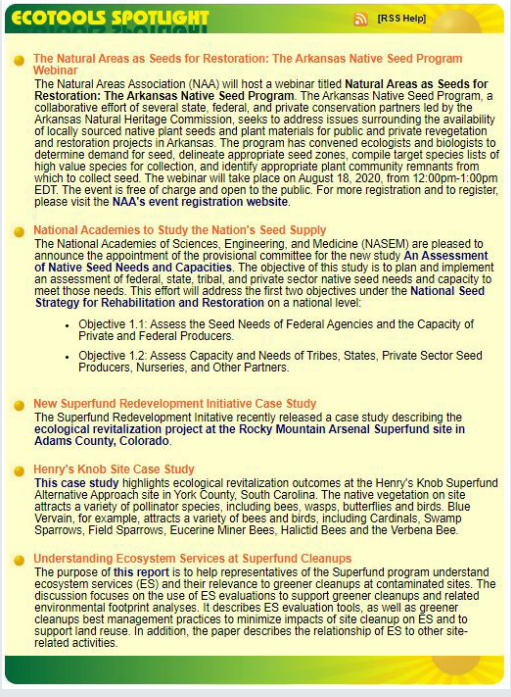
USDA Natural Resource Conservation District

- Agricultural Management Assistance (AMA) helps agricultural producers use conservation to manage risk and solve natural resource issues through natural resources conservation.
- Conservation Stewardship Program (CSP) helps agricultural producers maintain and improve their existing conservation systems. Participants earn CSP payments for conservation performance—the higher the performance, the higher the payment.
- Conservation Innovation Grants (CIG) help public and private grantees develop the tools, technologies, and strategies to support next-generation conservation efforts on working lands and develop market-based solutions to resource challenges. Funding for on-farm trials support implementation and testing and adoption of innovative approaches, practices, and systems on working lands.
- Rural Energy for America Program helps communities with populations less than 50,000. This program provides guaranteed loan financing and grant funding to agricultural producers and rural small businesses to purchase or install renewable energy systems or make energy efficiency improvements.

Technical Assistance Resource: EPA Technical Innovation and Field Services Division

Ecological reuse returns polluted or otherwise disturbed lands to a functioning and sustainable use by increasing or improving habitat for plants and animals. “Ecological land reuse” is a broad term that encompasses a number of interrelated activities including the reconstruction of antecedent physical conditions, chemical adjustment of the soil and water, and biological manipulation, which includes the reintroduction of native flora and fauna.

EPA’s Technical Innovation and Field Services Division (TIFSD) has provided resources to site managers, landowners and stakeholders to support ecological revitalization and use of soil amendments to support healthy habitats and advance site remediation objectives. TIFSD compiles best practices in ecological revitalization at Superfund sites, provides direct technical assistance through soil science specialists, and provides regular training regarding use of soil amendments and other ecological revitalization tools. For more information visit: www.clu-in.org/ecotools/default.cfm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The Natural Areas as Seeds for Restoration: The Arkansas Native Seed Program Webinar

The Natural Areas Association (NAA) will host a webinar titled **Natural Areas as Seeds for Restoration: The Arkansas Native Seed Program**. The Arkansas Native Seed Program, a collaborative effort of several state, federal, and private conservation partners led by the Arkansas Natural Heritage Commission, seeks to address issues surrounding the availability of locally sourced native plant seeds and plant materials for public and private revegetation and restoration projects in Arkansas. The program has convened ecologists and biologists to determine demand for seed, delineate appropriate seed zones, compile target species lists of high value species for collection, and identify appropriate plant community remnants from which to collect seed. The webinar will take place on August 18, 2020, from 12:00pm-1:00pm EDT. The event is free of charge and open to the public. For more registration and to register, please visit the **NAA's event registration website**.

National Academies to Study the Nation's Seed Supply

The National Academies of Sciences, Engineering, and Medicine (NASEM) are pleased to announce the appointment of the provisional committee for the new study **An Assessment of Native Seed Needs and Capacities**. The objective of this study is to plan and implement an assessment of federal, state, tribal, and private sector native seed needs and capacity to meet those needs. This effort will address the first two objectives under the **National Seed Strategy for Rehabilitation and Restoration** on a national level:

- Objective 1.1: Assess the Seed Needs of Federal Agencies and the Capacity of Private and Federal Producers.
- Objective 1.2: Assess Capacity and Needs of Tribes, States, Private Sector Seed Producers, Nurseries, and Other Partners.

New Superfund Redevelopment Initiative Case Study

The Superfund Redevelopment Initative recently released a case study describing the **ecological revitalization project at the Rocky Mountain Arsenal Superfund site in Adams County, Colorado**.

Henry's Knob Site Case Study

This case study highlights ecological revitalization outcomes at the Henry's Knob Superfund Alternative Approach site in York County, South Carolina. The native vegetation on site attracts a variety of pollinator species, including bees, wasps, butterflies and birds. Blue Vervain, for example, attracts a variety of bees and birds, including Cardinals, Swamp Sparrows, Field Sparrows, Eucerine Miner Bees, Halictid Bees and the Verbena Bee.

Understanding Ecosystem Services at Superfund Cleanups

The purpose of **this report** is to help representatives of the Superfund program understand ecosystem services (ES) and their relevance to greener cleanups at contaminated sites. The discussion focuses on the use of ES evaluations to support greener cleanups and related environmental footprint analyses. It describes ES evaluation tools, as well as greener cleanups best management practices to minimize impacts of site cleanup on ES and to support land reuse. In addition, the paper describes the relationship of ES to other site-related activities.

Implementation Steps to Promote Ecological and Agricultural Reuse

IMPLEMENTATION STEPS		POTENTIAL TOOLS AND ACTIONS TO ADVANCE STRATEGY
1	**Engage stakeholders/build partnerships**	▪ Consider who will be responsible if additional cleanup or maintenance is required, especially in the long term. ▪ Work with property owners, farmers, ranchers, agriculture extension services, conservation organizations or land trusts early on during investigation to identify the range of anticipated future uses for the site.
2	**Assess suitability and opportunities**	▪ Consider whether the public will safely be allowed to use the property if it is converted to habitat. ▪ Evaluate the historical ecology of the site, and identify features to be restored. ▪ Identify required remedy components and any limitations on future activities that may be needed to help protect the remedy.
3	**Develop funding strategy**	▪ Identify planned cleanup activities and if additional ecological revitalization may be necessary for restoration. ▪ Ecological revitalization can be a more cost-effective process, however, the time required to return a property to functioning and stable habitat can take longer than other reuse alternatives.
4	**Implement/construct end use**	▪ Working with EPA project managers and landowners can allow use of native crops, grassland, forest or wetland vegetation to enhance site cleanups, and restore habitat, crop land, or grazing land.
5	**Promote long-term stewardship**	▪ Ensure that institutional controls are in place and operating effectively and consider who will be the long-term landowner responsible for stewardship of the ecological revitalization and associated natural resources. ▪ Consider long-term conservation of the land and resources.

Conclusions

Region 7's Superfund Lead Mining and Special Emphasis Team addresses mining and smelter sites and has worked with communities across the lower Midwest to cleanup and support a wide range of beneficial uses. The best practices, case studies and action steps addressed in the previous five fact sheets are intended to support property owners, local governments, state agencies, and EPA site teams in continuing to remediate properties, protect human health and the environment and return sites to beneficial use. For further information, additional resources are included in the Appendix.

Contact Information

For questions or additional information about this Guide or Superfund site reuse, please contact:

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