

Natural Resource Restoration Project Proposal for the
Southeast Missouri Lead Mining District

Native Vegetation Restoration of the Former Little St. Francis River Chat Pile



**Submitted by the Missouri Department
of Natural Resources**

October 2016

Restoration Project Information Sheet

General Information

Organization: Missouri Department of Natural Resources

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Project Information

Type of project: The purpose of this project is to restore native woodland vegetation to the riparian area formerly known as the Little St. Francis River Chat Pile (West) and conduct non-native species removal on adjacent city owned property. The former chat pile has been remediated by the United States Environmental Protection Agency (USEPA) leaving an area of approximately 5.0 acres of fescue field where bottomland forest was native before mining occurred at the site.

Project name: Native Vegetation Restoration of the Former Little St. Francis River Chat Pile

Location: The site is located west of the city of Fredericktown and is accessed from a gravel road leading from Catherine Place to the property. See attached map.

County: Madison County

Watershed: Upper St. Francis River/Little Saint Francis River Sub-Watershed

Project size: 10 acres, approximately

Latitude (decimal degrees): 37.573245 Longitude (decimal degrees): -90.310706

Introduction and Background

The federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authorizes claims for “damages for injury to, destruction of, or loss of natural resources” as a result of the release of a hazardous substance [42 U.S.C § 9607(a)(4)(C)]. Any compensation received as a result of resolving a claim for natural resource damages must be used for “the restoration, rehabilitation, or replacement or acquisition of the equivalent of” any lost natural resources or their services [42 U.S.C. § 9611(i)]. This CERCLA process is referred to as natural resource damage assessment and restoration (NRDAR) the goal of which is to compensate the public for the loss of resources and their services resulting from a release of a hazardous substance.

Missouri Trustees and the Trustee Council

CERCLA, and its implementing regulations, designate federal and state authorities to act on behalf of the public as trustees for natural resources, including supporting ecosystems, belonging to, managed by, controlled by, or appertaining to such state, or by the United States. [42 U.S.C. § 9607(f); 40 C.F.R. § 300.600 and § 300.605]. Per these authorities, the Governor of the State of Missouri has appointed the director of the Missouri Department of Natural Resources (MDNR) as the designated state trustee, while the U.S. Fish and Wildlife Service (USFWS) is acting as the federal trustee on behalf of the U.S. Department of the Interior in the Southeast Missouri Lead Mining District (SEMOLMD, collectively “Trustees”). The Trustees formed a Trustee Council by a Memorandum of Understanding. The Trustee Council coordinates activities for both assessing injuries to natural resources and their services and the restoration, replacement, rehabilitation, or acquisition of the equivalent of the lost natural resources and their services upon receipt of compensation from potentially responsible parties.

Restoration Plan

Pursuant to CERCLA, the Trustees developed the Southeast Missouri Ozarks Regional Restoration Plan (SEMORRP) which provides a process framework that governs the approach for restoration project identification, evaluation, selection and implementation [42 U.S.C. § 9611(i)]. The SEMORRP is available at: <http://dnr.mo.gov/env/hwp/sfund/docs/nrd-final-semorrrp.pdf>. As part of the restoration process, an agency member of the Trustee Council may submit proposal(s) for restoration projects to be evaluated by the larger Trustee Council in accordance with the factors discussed in the SEMORRP.

Site Background and Overview

This project takes place within the floodplain of the Little St. Francis River (LSFR) watershed, a tributary to the St. Francis River. The site is located within the Madison County Mines Site (MCMS) in southeastern Missouri near Fredericktown at the southern end of the Old Lead Belt (OLB). Past smelting and mineral processing operations left numerous chat and tailings deposits, contaminated with high concentrations of heavy metals, in Madison County. As a

result of the high level of heavy metals concentrations, the MCMS was placed on the National Priorities List (NPL) on September 29, 2003, and has been undergoing response actions led by the U.S. Environmental Protection Agency to clean up the contamination.

In 2009, the Trustees settled claims for natural resource damages with ASARCO, LLC. Recovered restoration funds for Madison County were directly related to ASARCO operations at the Catherine Mine and Mill and LSFR chat pile.

Project Proposal

In its role as a Trustee, the Missouri Department of Natural Resources submits the following restoration project proposal to the Missouri Trustee Council. The proposed restoration action is for primary restoration to directly restore injured natural resources and their services lost in the Old Lead Belt. The project location is on the City of Fredericktown property, just south of the City Lake (which is a city park) and northwest of the city proper. The proposed restoration project entails re-vegetation of the location of the former LSFR Chat Pile on the western side of the LSFR and invasive species removal and habitat improvements on city owned land adjacent to the former chat pile. If approved by the Trustees, the project would be funded by monies received from the ASARCO settlement for Madison County in Southeast Missouri (SEMO).

Current condition and the need for restoration

The Little St. Francis River (LSFR) Chat Pile was partially excavated prior to 1955 and erosive transport of the chat to the LSFR also occurred during this time period; the majority of the chat from the pile was removed between 1981 and 1986. In 2010, a removal of the majority of the remaining chat was completed by USEPA as part of its ongoing response action at the MCMS. Chat remains on the western banks of the Little St. Francis River along with other areas of chat located near the bank on the eastern portion of the area to be restored. These nearby areas are scheduled to be remediated by the USEPA in the spring of 2017 as part of a remedial action for Operable Unit 5. Following the additional remedial actions, we propose to restore the full area of the former LSFR pile.

In addition to the former chat pile, the city owns a large contiguous expanse of woodland along the west bank of the LSFR. The area currently contains several common invasive plant species including autumn olive, honey suckle, and eastern red cedars. Requested funds would allow treatment of city owned areas on the west bank of the LSFR in an effort to improve available habitat for wildlife.

Project Description

This proposal is focused on restoring 5 acres of riparian and floodplain habitat directly injured by mining activities and removing invasive species on adjacent land in order to expand the available habitat for wildlife including pollinators and migratory birds. Currently, the location _____

of the former chat pile is comprised of fescue planted as part of the USEPA remedial action. This type of monoculture limits available habitat and will be restored to mesic bottomland forest. Re-forestation will help to increase available habitat types and support a more diverse ecological community. Following surveys for invasive species and the removal of invasive species, the former pile area will be sprayed with herbicide to eliminate fescue before planting commences. The species of trees to be planted will be determined after the results of general soil analyses (pH, sodium, organic matter, phosphorus, calcium, magnesium and potassium) are available and in consultation with the Missouri Department of Conservation (MDC) Regional Forester. Soil testing will help to determine if fertilizer and /or lime needs to be incorporated into the soil and in what quantities. Larger trees will be spaced 20 feet apart in a staggered formation and smaller trees (understory) will be placed between the large trees (See Exhibit 3). Three-gallon size trees will be used for planting to ensure greater survivability. All trees will be caged to protect against wildlife foraging and rubbing. A weed barrier will also be placed around each planting. A grass species, such as Virginia wild rye, may be planted in the bare areas to prevent invasive species growth. Another option would be to leave the fescue in these areas until the trees are established; then spray the fescue with herbicide and plant a native seed mix (such as a pollinator mix). The area between trees will be mowed at least once a year in addition to the weed barrier to prevent the growth of invasive species. This mowing will continue for five years.

Project Location

- St. Francis River Watershed – This project will take place in the floodplain of the Little St. Francis River, a sub-watershed of the St. Francis River, on and around the former Little St. Francis River Pile on the western side of the river. The property is owned by the city of Fredericktown. See Exhibits 1, 2 and 3 for maps of the area.
- The site is located just south of the Fredericktown City Lake and to the northwest of the city center. It is city-owned property that will eventually become part of a city park which may provide for additional recreational opportunities consistent with the purposes of CERCLA.

Connection to the Injured Resources

This proposed project is intended to address natural resources that the Trustees have identified as injured by releases of heavy metals in the Old Lead Belt, such as soils, sediments, surface water and migratory birds. The proposed project will restore riparian and floodplain habitat at and around the site of the remediated chat pile which will help to re-establish the natural aquatic flood regime. As well as rehabilitating residually contaminated soils and sediment, the re-vegetated floodplain and riparian area will provide high-quality habitat for wildlife, including migratory birds.

Releases from the LSFR pile injured aquatic and terrestrial resources. One hundred percent of fish samples collected between 1981 and 2006 exceeded adverse effects thresholds in the Little St. Francis River (IEC, 2007). Four miles of the Little St. Francis River sediments from the LSFR pile downstream are injured (MDNR 2007). Plant communities at the pile were

considered injured due to reductions in the production of biomass and reduced provisions of habitat as seen on aerial and ground photographs (IEC 2007).

Project Benefits

- Restores native habitat to the riparian zone of the Little St. Francis River, which is a stream injured from historical and ongoing releases of metals such as lead, cadmium and zinc from lead mining practices in Madison County.
- Replacement of fescue monoculture with native shrubs and trees and the removal of invasive plant species will increase habitat diversity and robustness for the benefit of riparian biota.
- Watershed/aquatic/riparian/floodplain protection and enhancement. Restoration of this currently remediated fescue field to wooded riparian will provide benefits to the aquatic and terrestrial biota. Riparian vegetation regulates light and temperature regimes, provides nourishment to aquatic as well as terrestrial biota, regulates the flow of water and nutrients from uplands to the stream, and maintains biodiversity by providing a diverse array of habitat and ecological services (Naiman and Decamps 1990).
- Re-forestation of the riparian corridor would provide foraging habitat for the federal and state endangered gray bat (*Myotis grisescens*), which is known to occur in the St. Francis River watershed and has been identified in Madison County.
- The area will be preserved in perpetuity with conservation easements.
- The city plans to build a park with an interpretive trail along the river (likely mulched) but at least twenty feet from the bank with a few access points to the river. By limiting access points, the city will preserve the integrity of the stream banks by limiting erosional areas from foot traffic, and ensure that the restoration project continues to meet the goals of CERCLA to restore the resources that have been injured.

Ecological connectivity

- The Little St. Francis River restoration project will help to restore the original function of the floodplain and in the long term will serve to provide additional healthy floodplain and wildlife habitat on the Little St. Francis River.
- The restoration of forested riparian will establish connectivity between the forested riparian areas upstream and downstream of the former chat pile. Larger tracts of forested riparian are better for many species of wildlife, especially forest dwelling warbler species.

Qualified project proposers

- MDNR has specialists on staff that develop, plan and execute land and resource management, and restoration activities as part of Natural Resource Damage (NRD) operations. In addition to NRD staff, MDNR has other specialists to assist with vegetation identification and project oversight and implementation. Also the MDNR can rely on other

state and federal agencies in assistance with design and implementation.

Proposed Budget*

Costs description	Explanation	Amount	Recipient
Baseline, Annual and Final Monitoring Surveys and Reporting	Field work and reporting costs for five years.	\$15,000	USGS-Columbia Environmental Research Center
Conservation Easement and Long term maintenance	Mowing, trimming, prevention of trails/ATV activity, riparian protection/upkeep, etc.	\$35,000	City of Fredericktown, Local Land Trust, and/or MDNR
Site Restoration Activities	Tree planting, herbicide application, invasive species control, etc.	\$40,000	Contractor or Project Partner
	Total	\$90,000	

*Forest ReLeaf of Missouri may provide some of the trees as matching funds.

Project Partners

MDNR is seeking to partner with Forest ReLeaf of Missouri as a supplier of trees/shrubs for the project. Forest ReLeaf is a not for profit entity that has been serving urban communities in Missouri since 1993. They serve as a catalyst for restoring and sustaining urban forests by providing no cost plant material used in reforestation.

In addition to funds provided by the Trustees, the City of Fredericktown will provide in-kind match of staff time and equipment for long term maintenance and monitoring at the site, after the initial five years of planting and maintenance.

Maintenance Requirements

A Trustee council representative will inspect the progress of the plantings every quarter of each year for five years total. Each summer the grasses will be mowed at least once between the plantings to reduce the growth of any invasives. A yearly spot spraying of herbicide might also be required during this time frame. Any re-plantings of trees/shrubs will occur once a year for the entirety of the five year period of Trustee oversight. Further invasive species control in the project area will also occur during this same period.

Timeline

The project will commence as soon as possible with proposed completion of planting/re-planting of vegetation within 5 years. The budget then allows for long term monitoring of the site. Design, including initial survey, spraying of herbicide, re-vegetation, and invasive species removal to be completed in year one after receipt of funding. Follow-up surveys and oversight are to be conducted over the next five years. Re-vegetation of some of the plot may be necessary depending on the success of the plantings, weather conditions, flooding, and animal predation/rubbing activities.

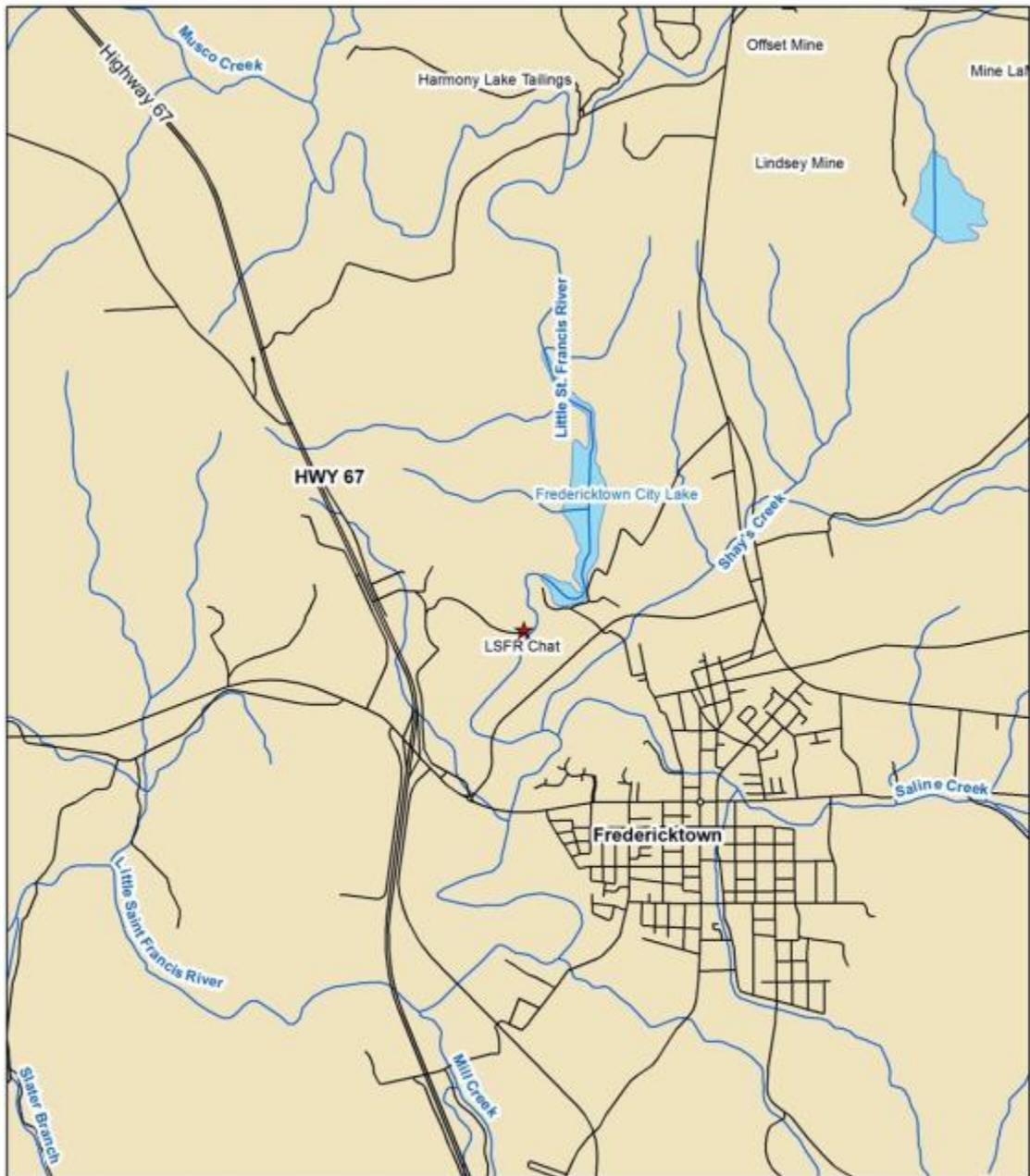
Permanence

All of the restored area of the floodplain on and around the LSFR Chat Pile will have an environmental covenant placed on it that shall remain with the property in perpetuity even if the property is sold. After the five year period of oversight by the Trustees, the city of Fredericktown will be responsible for the oversight and management of this area. The United States will hold a third party right of enforcement for the conservation easement on the property.

Measures of Success

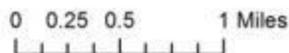
An initial vegetation survey will be conducted by USGS before the project begins. Inspection of the plantings will occur on a quarterly basis for a five year period after the initial planting of trees/shrubs. Photographs will be taken at each visit and a yearly progress report will be written to quantify the growth of the planted vegetation. Eradication of invasive plant species on the property adjacent to the former pile will be assessed after each treatment. At the end of the five year timeframe of the project, USGS will write a final report on the amount of growth of the trees/shrubs, any new or continued undesirable growth of invasives, general health of the vegetation, and overall success of the plantings. The report will also include a photographic history from the beginning stages of the plantings to the attainment of tree/shrub growth after five years of intensive re-forestation efforts.

Exhibit 1: Location of Little St. Francis River Restoration Area



Legend

- Roads
- MAJOR_LAKES
- Streams
- ★ Restoration Site



Map created by Kelly Rangan March 2010
This map can be found at M Superfund/NERD
SEDM Restoration/LSFR Pipe
Fredericktown, MO, File.mxd
Although all data used to create this map have been
compiled by the Missouri Department of Natural Resources,
no warranty, expressed or implied, is made by the department
as to the accuracy of the data and related materials. The act of
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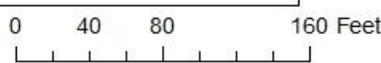


Exhibit 2: Little St. Francis River Pile - Area of Restoration



Legend

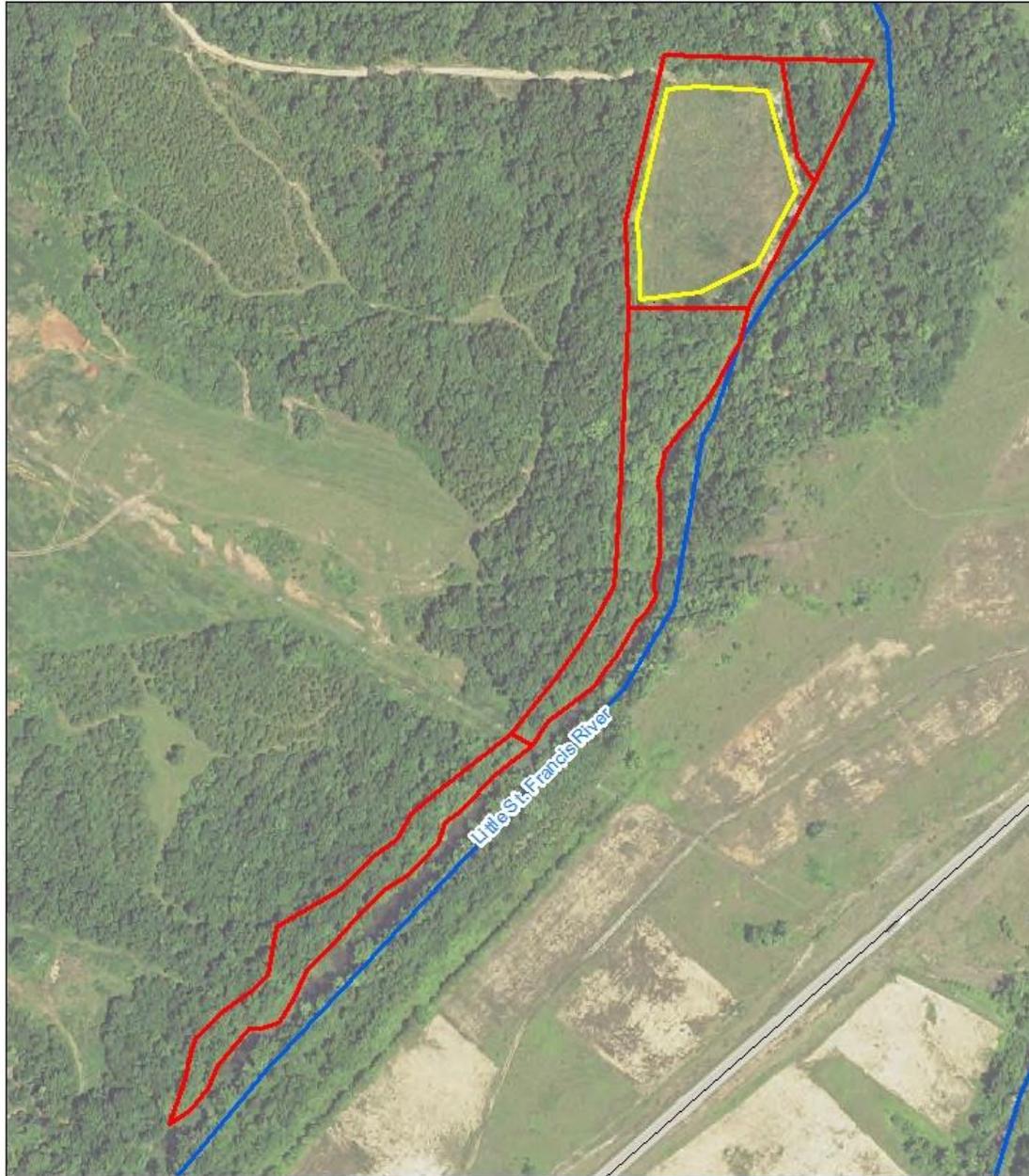
- Area of Restoration
- Roads
- Streams



Map created by Kelly Rausen March 2016
This map can be found at: \\geoparc\dnr\GIS\LSFR_Restoration\LSFR_Pile\LSFR_Pile.mxd
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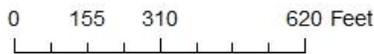


Exhibit 3: Proposed Invasive Species Removal Areas



Legend

-  Area of Restoration
-  Proposed Invasive Species Removal



Map created by Kathy R. Angen March 2016
This map can be found at: http://www.sdsu.edu/~kragen/LSFR/LSFR_P101.mxd
Although all data sets used to create this map have been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data and related materials. The user of this map shall not be held liable for any damages, and no responsibility is assumed by the department in the use of these data or related materials.

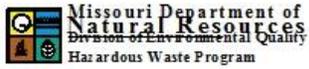


Exhibit 3: Example Configuration of Tree/Shrub Plantings.

X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	
X		o	o	X		o	o	X		o	o	X		o	o	X		o	o
o	o	X		o	o	X		o	o	X		o	o	X		o	o	X	

Each cell is 10 feet by 10 feet. X=canopy tree. o=shrub/small tree.

References

Industrial Economics, Inc. (IEC). 2007. Expert Report Concerning Estimation of Natural Resource Damages in the Southeast Missouri Lead Mining District in the ASARCO, LLC, Chapter 11 Bankruptcy Matter.

Missouri Department of Natural Resources (MDNR). 2007. Environmental Services Program. Madison County Mines Tailings Superfund Site. Sampling Data from Logtown Branch and Little St. Francis River.

Naiman, R. J. and H. Decamps. *The Ecology and Management of Aquatic-Terrestrial Ecotones*. 1990.