Has the Lead Turned to Gold?

Depends Upon How You Look at It:

ways of cost effectively looking at remedy success

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Key message:

CERCLA says that we are to select “protective remedies”: we have traditionally equated that to a media concentration which is definitively protective. Translation – obtaining a media concentration is the performance measure we are using for remedy success.

For remedies which alter contaminant availability or toxicity we need performance measures other than concentration.

In order to use alternate performance measures you need to plan for their use which includes involvement and buy-in by the stakeholders. With forethought and planning this can be cost effective.

Is our current paradigm for concentration reduction as a remedy goal always consistent with sustainability?

In order to effectively select alternate performance measures you need to think about what the site use will be.

This is not new, we look at sites and we think about what remedy options are realistic.

The performance measures need to be consistent with site use and meet the needs and expectations of the stakeholders.

Palmerton, PA, 1980; Blue Mountain.

So if we are going to turn this

To this

Palmerton, PA, 1990

We start by thinking about land use

NOTE: CURRENTLY RESIDENTIAL LAND USE IS NOT AN OPTION, UNLESS THE CONTAMINANTS DO NOT POSE A HUMAN HEALTH RISK)

Option #1: How do we determine risk?

Answer: through a risk assessment.

So, use the risk assessment as the tool to assess the remedy performance. If the residual risk is acceptable – the remedy is successful.

We need to think about what contaminant cause the current risk and which may cause risk if the land use changes.

We need know what information are we going to need to justify the risk reduction so that we meet the threshold criteria for protectiveness.

Remember, this is an active process, not passive, not MNP.

Once we have an idea of the land use options we need to understand the contaminant fate transport and risks. The “impacts” can be obvious and risk can be documented easily which can be a trap.

Can have:

Loss of soil

Waste rock

Tailings

Mine drainage


The site can be any scale
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Releases can be:

atmospheric

water transport

erosion or

placement

Surface discharges

The impacts, scale, and chemical transport and fate all effect options

So how do we do this?

We produce an ERA.
If done well this tells us what COCs are important where
and
the nature and extent of contamination can tell us the contaminant chemical form and fate & transport.

For Mining Sites we typically need to know:

If the observed impacts and/or risks are physical, agronomic or contaminant dominated

What are the current chemical forms and under what conditions will they change chemical form?

What contaminants (metals) are toxic where and to what organisms (assessment endpoints)

Cd through food chain

Pb through direct sediment ingestion

Cu or Zn through direct water exposure

When contaminates move they can change form and expose different receptors - terrestrial areas can be the source of risk to the aquatic system, This relates back to the potential land use options.

Have met our goals?

Have we remediated the correct risk drivers?

Is the site now an attractive nuisance?

Could different contaminants be presenting unacceptable risk after the remediation?

OK so what does this mean exactly?
What could the performance measures be?

Risk reduction can be demonstrated through measures of toxicity and contaminant mobility – it is your performance measure.

The risk assessment is the basis and baseline for the evaluation of the performance of the remedy.

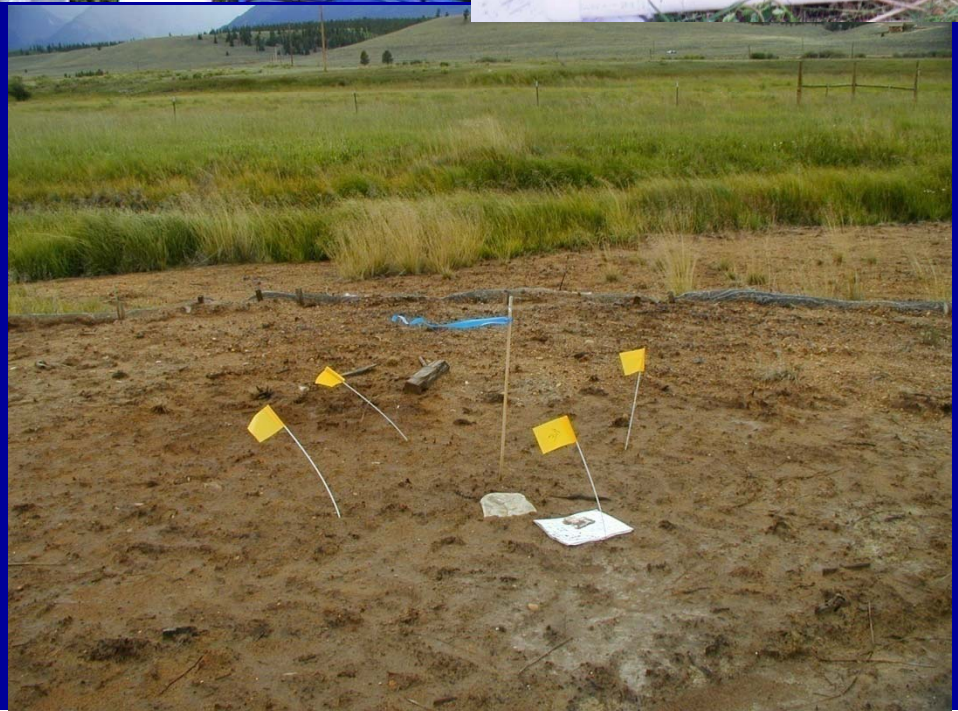
However, the acceptability of the remediation may remain an issue. That is why you need to involve the stakeholder and they must buy into the selected performance measures.

Earthworm *(Eisenia foetida)* Assays - Survivorship & Biomass/Organism

Sample	Untreated		Treated	
	Survival (%)	Biomass (mg)	Survival (%)	Biomass (mg)
CL	0	NA	100.0	329.3
CO	0	NA	98.9	323.0
MB/ME	0/0	NA	90.0	372.0
RA/RB	0/0	NA	10.0*	280.3
Ref. A	-	-	98.7	244.0
Upst. Ref.	-	-	96.7	196.0
Lab Con.	100	not measured	100.0	258.6

* significantly < reference samples and/or control sample

Bioaccumulation studies



Plant community and health studies, biomass production

This is an example of a biomass production performance measure

However the performance measure can not be
“not statistically significant accumulation above background”.

There will be accumulation above background.

The question is not what is the concentration; the question is whether or not there is unacceptable risk – is the remedy protective?

Remember : future land use plays a part in the acceptability of the remediation technology especially in relation to human health risk

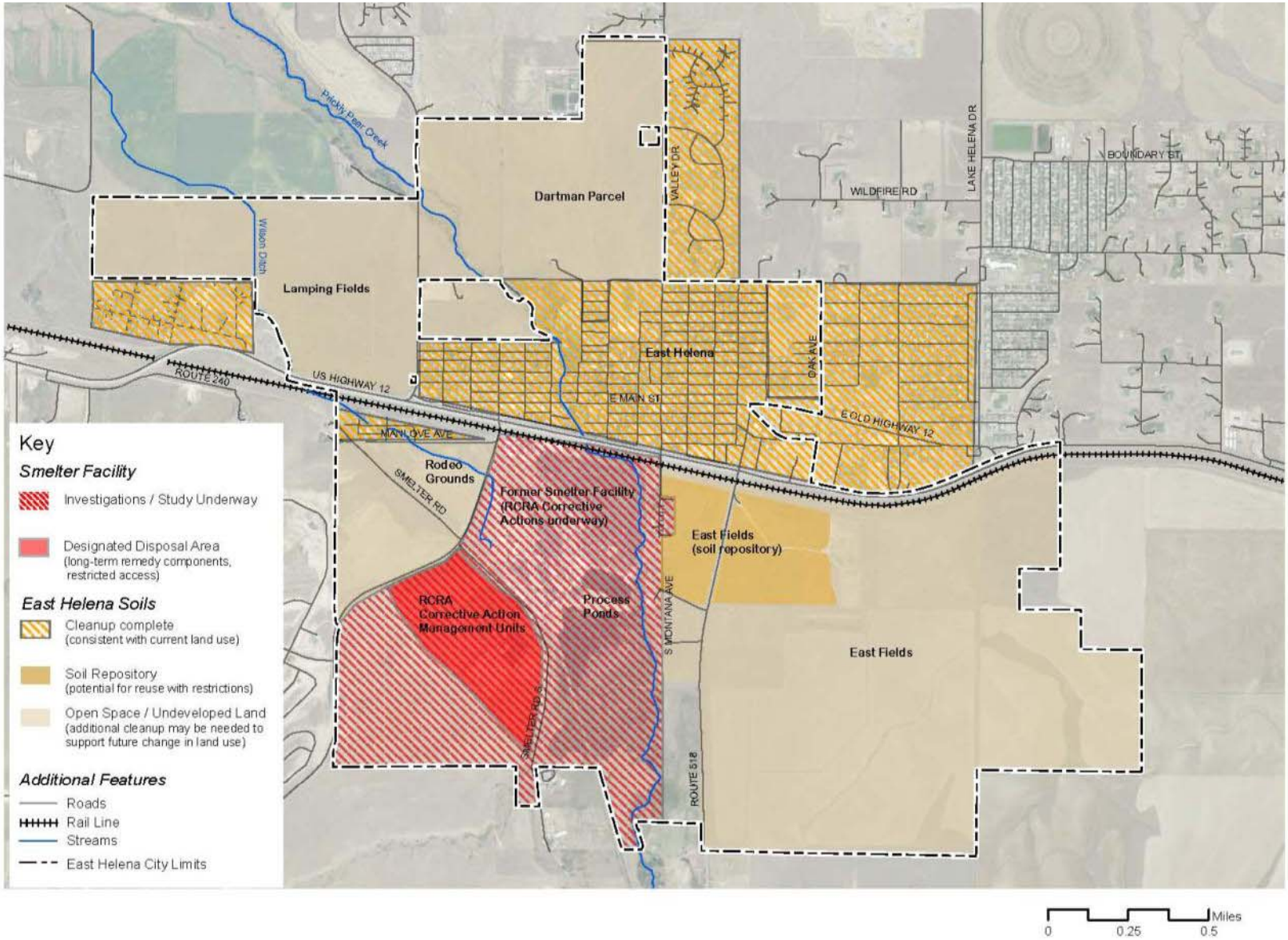
A site strategy must be developed to accomplish the site goals and establish realistic expectations and remedy success evaluation benchmarks, remember:

The total soil concentrations will not significantly change.

There will be statistically significant accumulation above background of something; however that does mean the action was not a success.

Question:
Is it always sustainable to remove contaminated media and replace it?

East Helena Overview



East Helena Reuse Planning Charrette

Technical assistance provided to support reuse planning charrette

- On-site consultation
- Participation in day-long charrette to integrate technical expertise into remedy and reuse considerations

Charrette Outcomes

VISION FOR THE FUTURE

Guiding Principles

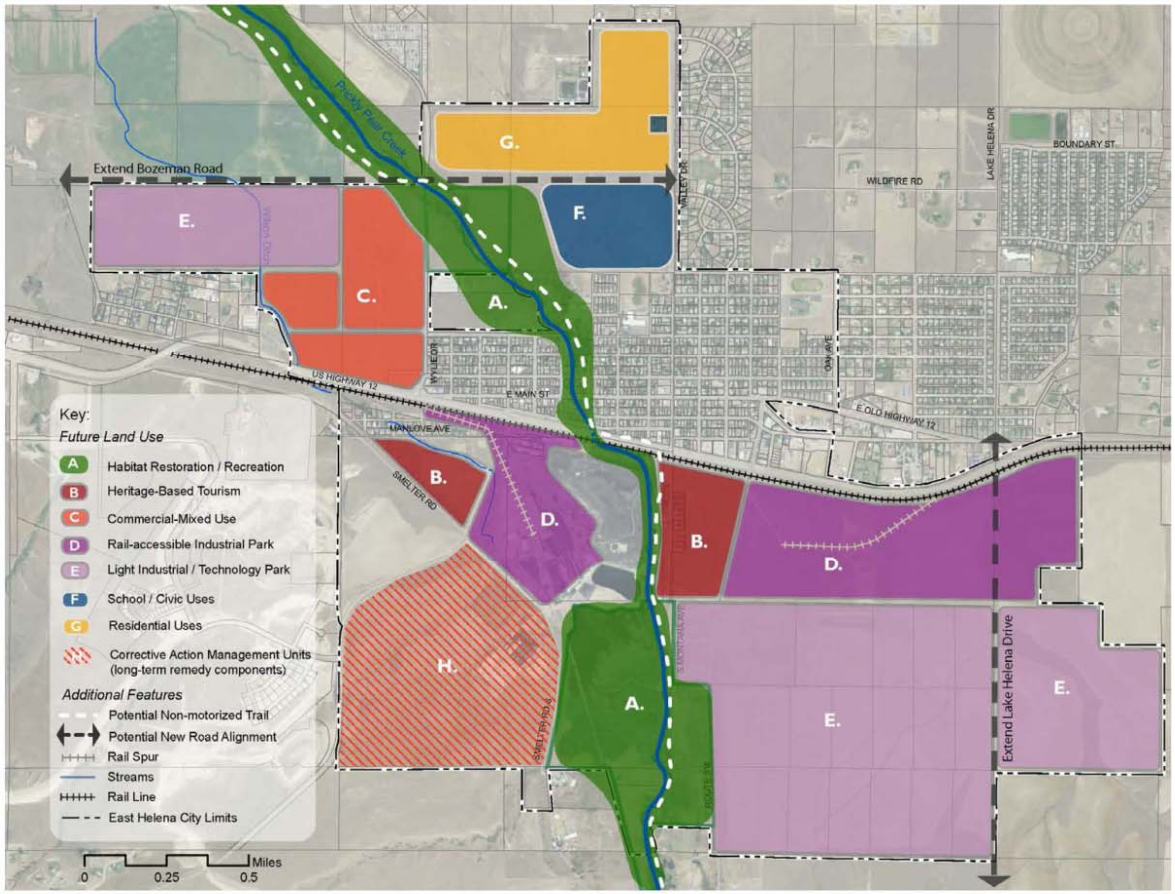
This concept plan integrates the key strategies developed during the community planning charrette. Sections on the following pages provide more detailed strategies and recommendations for each of the three focus areas: land use and development, cultural heritage, habitat and recreation.

Participants highlighted the following common themes and principles to guide a vision for the future:

- Jobs
- Livability
- Transportation
- Trails
- Creeks
- Connectivity
- Heritage

In addition, participants emphasized the need to facilitate redevelopment at key catalyst sites such as the Plant Manager's house, Lamping Fields, and parts of the East Fields and the desire to increase certainty in the development process.

Future Land Use Concepts



Focus Areas

Specific priorities are listed below for each focus area. More detailed strategies for each focus area are outlined in the following pages.

Land Use & Development Priorities

East Fields - Establish an industrial park as a catalyst for economic development.

Recreation & Heritage Corridor - Support recreation and heritage-based commerce at the Plant Manager's property and Prickly Pear Creek corridor.

Lamping Fields - Develop commercial retail and office or professional uses.

Dartman Parcel- Expand public, institutional and residential uses.

Cultural Heritage Priorities

Plant Manager's property - Preserve and restore the Plant Manager's property as a heritage museum and catalyst for community revitalization.

Heritage & Recreation - Extend heritage and recreational uses into surrounding area to support the reuse of the Plant Manager's property.

Habitat & Recreation Priorities

Regional Trail Network - Establish a regional trail network connecting East Helena to Helena, Lake Helena and Montana City.

Heritage & Recreation - Restore the Prickly Pear Creek riparian corridor through East Helena.