

# Brownfields - Group No. 1

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# Brownfield definition (Uwe et al. 2006)

- Have been affected by the former uses of the site and surrounding land
- Are derelict or under used have real or perceived contamination problems
- Require Intervention to bring them back to beneficial use



# Causes of brownfields

- Company group collapses
- Sector transformation
- Economical and innovation cycles

# Types of brownfields



Military area in Ralsko

# According to their origin

- Industrial
- Cultural
- Institutional
- Administrative / Commercial Activities
- Military
- Agricultural
- Remains of mining activities

# According to their economic attractiveness

- Project with zero balance
- Project with slight support
- Uncommercial project
- Dangerous project
- Other projects



Town spa in Jablonec nad Nisou

# Externalities



Former textile factory in Liberec

# Negative

- Take the space that isn't effectively used
- Not esthetical for the surroundings
- Often have ecological burdens  
vandalism
- Decrease in the quality of environment
- Unbalanced use of infrastructure
- Who can, moves from the brownfield area → gray zone (problematic individuals, raise of the criminality..)
- Brownfields residents cannot find new jobs and are being excluded from the society
- Sanation costs
- The market value of surrounding estates is decreasing and could be unsaleable



# Positive

- Additional income of the brownfield residents, increase of their purchasing power → rejuvenation economical activities
- The income would be taxed
- People would not be moving and the employment raises

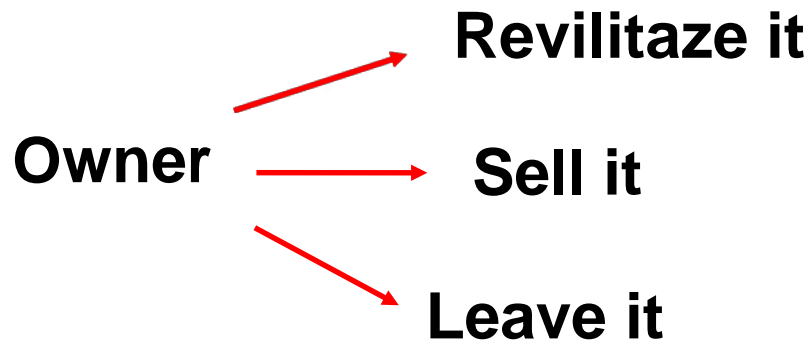
# Lost opportunity

- Brownfields could bring utility if they were used
- New job positions, missing services, apartments etc.

# Do I own a Brownfield?

Is my land idle, vacant, or less productive than it ought to be?

Are concerns about environmental contamination contributing to the problem?



# Types of Owners in Brownfields



- Brownfield owners are usually those who were left out by market changes
- Unable to act: Age or infirmity - Living abroad
- Unknown / Cannot be located / Known
- Reasons: Lack of money - Property for speculation – Large property holdings



# Why the interest in helping brownfield owner?

- Health problems
- Reduce the property values
- Potential lawsuits  
(little income from their property – Pay tax)
- A new source of employment
- Revitalized brownfields (New life)



# Main actors in the revitalization of brownfields



- Advising and facilitating owners
- Land use and planning activities
- Assisting owners
- Prevention of new brownfield creations

## Local government

- Willingness to collaborate **Kč / €**

- Brownfield identification

- Advising and supporting owners

- Brownfield effects mitigation

- Brownfield reuse promotion

- Public demonstration

## Landowners

## Community

# Selling Brownfield Properties

€ Sell the property “as is”

Kč. Sell the property after an assessment has been performed

€ Sell the property after assessment and cleanup.



# Why not leave a brownfield property in its current condition ?



Neighborhood property values too low



A slight level of contamination



Cocos Island, Costa Rica 2012.

## What is Rewilding?

Reinstating Natural Processes



# Urban Rewilding



Dessau, Germany

# Rewilding Europe



Military Camp Milovice; Czech Republic

# Decontamination of Brownfields

## Regeneration of Brownfields

- Soil investigation: heavy metals and hydrocarbons are of most concerned contaminations.
- Validation of rebuilding brownfields.
- Removing abandoned construction materials and recycle building materials.
- Cleaning contaminated substance.
- Holding pollutants in storage tank.
- Chemical transformation of pollutants into less harmful compounds.
- Using environment friendly bioremediation methods.

# Bioremediation

Using biological process to treat contaminated media by altering environmental conditions to stimulate growth of microorganisms and degrade the target pollutants.

Less expensive and more sustainable than other remediation alternatives.



# Phytoremediation

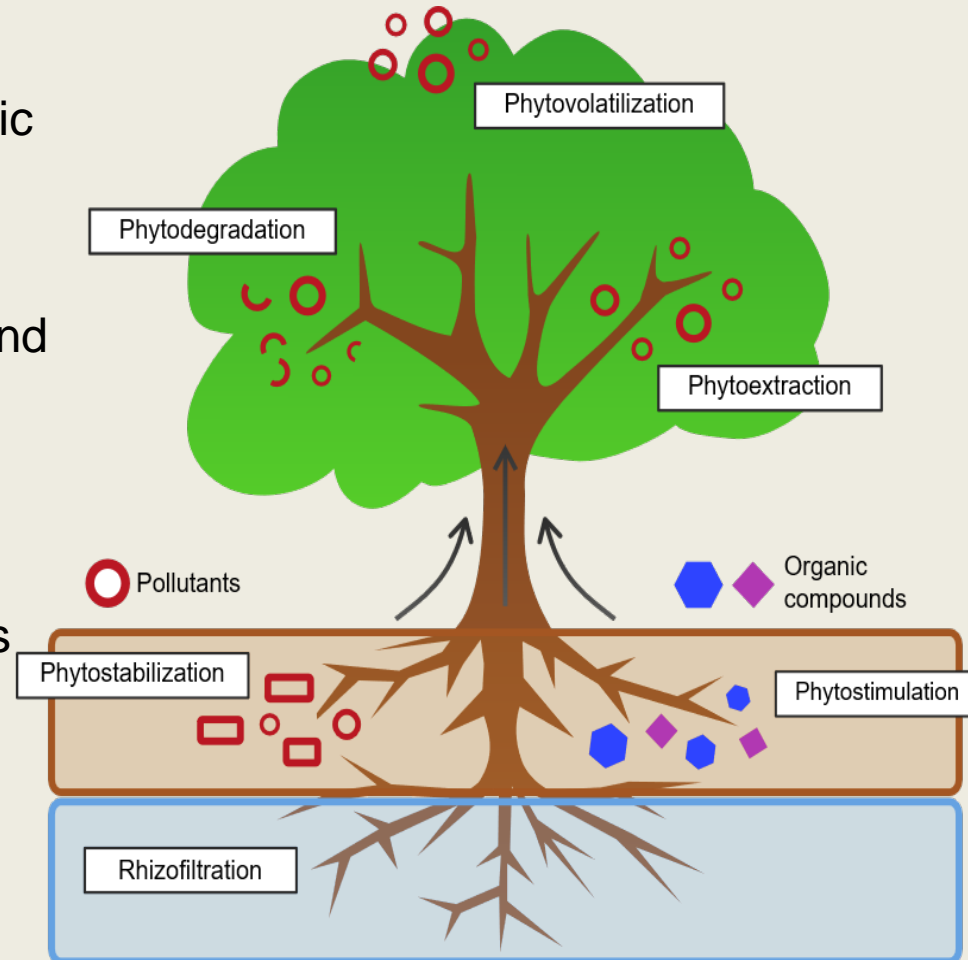
- The use of living plants and associated microorganisms to clean up or remove toxic contaminants in environmental.
- Interdisciplinary approach of biological and engineering techniques.

## Major targets:

Toxic heavy metals and organic pollutants

## Advantage:

Cost-effective plant-based approach



# Phytoremediation

## Advantages:

- Lower cost both *in situ* and *ex situ*
- The plants can be easily monitored
- The possibility of the recycle and re-use of valuable metals
- It is potentially the least harmful method
- Plants also reduces erosion
- It preserves the topsoil, maintaining the fertility of the soil

## Limitations:

- Limited to the surface area and depth occupied by the roots.
- Low extraction rate, slow growth and low biomass require a long-term commitment
- Survival of the plants is affected by the toxicity.
- Additional nutrients, vitamins, minerals, and pH buffers may be needed.
- Toxin metals pass into the food chain.



# Benefits of brownfield

## Ecological benefits:

### Cleaned up site:

- Treated industrial and organic waste
- Sewage management system

### Shaped landforms:

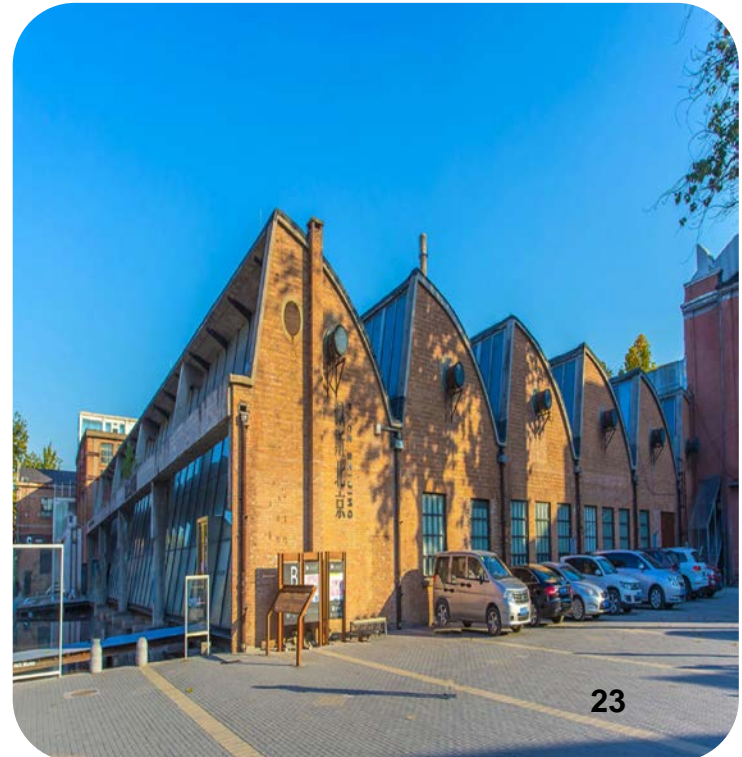
- Transforming the dangerous environment into a pleasant amenity.
- Re-forestation and anti-fragmentation
- Artificial destruction ( by removing upper layer soil), impacts for conservation

## Biological benefits:

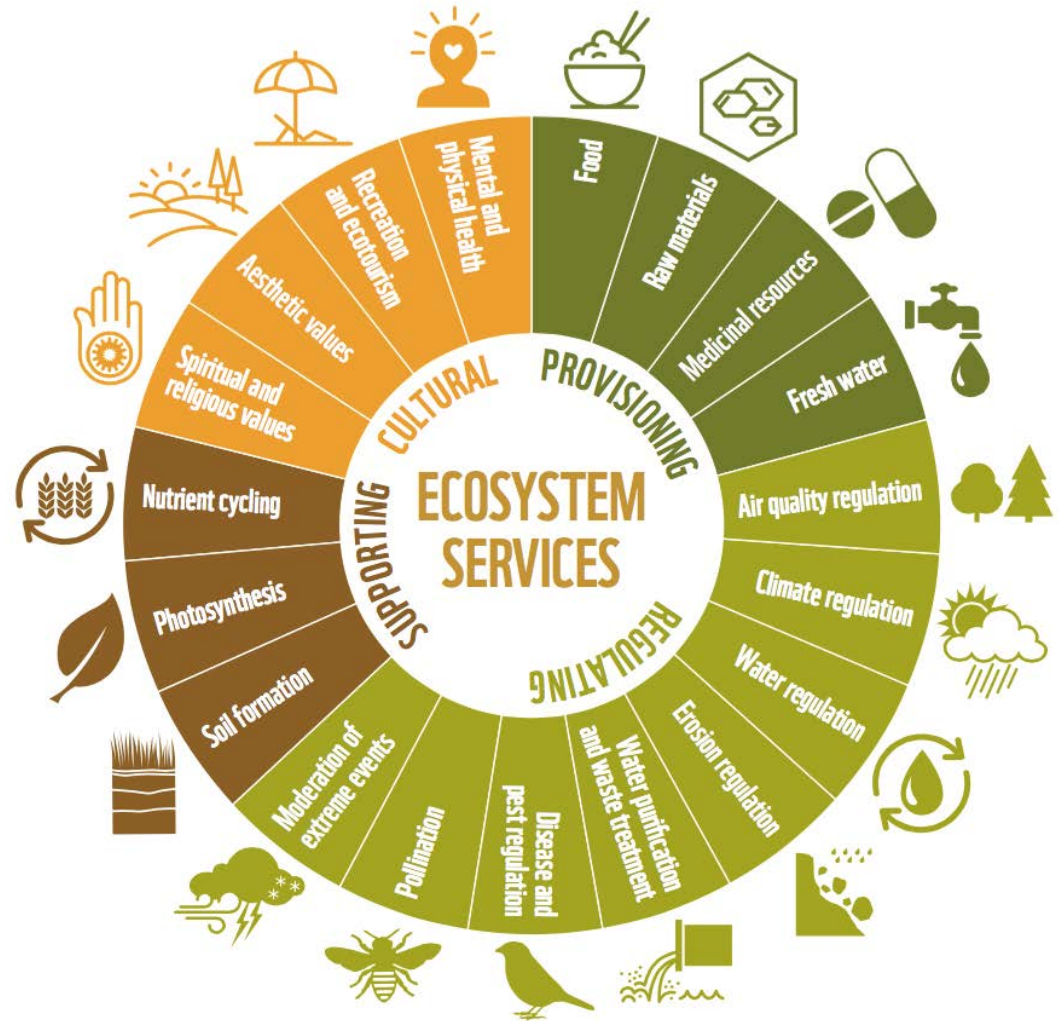
- Diverse habitats for wildlife:
- Self-reproductive wild flora and fauna community.
- Minimum intervention and low maintenance in green area

## Other benefits:

- Integration of art and new technology.
- Development of urban.
- Mitigate conflict such as noise, traffic congestion and high density of residents in inner-city.







# Ecosystem Services provided by brownfields





# Precondition:

Significant cover by shrub, tree or grass vegetation  
(ecological succession)

			
<p>Pioneer Vegetation</p>	<p>Persistent Ruderal Vegetation</p>	<p>Tall Herbaceous Vegeta- tion</p>	<p>Spontaneous Wood</p>
<p>Initial 3-year fallow period: open fragmen- tary ruderal pioneer populations with short- lived, annual species</p>	<p>Fallow period of 3-10 years: encroaching vege- tation, increasing persis- tent ruderal vegetation, single bushes higher than 5 m</p>	<p>Fallow period of 10-50 years: mainly persistent species, ruderal tall forbs, bushes, single groves higher than 10 m</p>	<p>Fallow period of more than 50 years: dense groves, if not completely covered highly growing herb layer, characteristic wood</p>

(Mathey et al 2016)

- **Habitat service**

Sanctuaries for rare species; nutrient depleted ground and poor water retention mimic natural habitats like sand dunes and heathland-> a lot of flowers-> a lot of pollinators

- **Microclimate regulation**

Cooling effect of green brownfields; air purification; carbon sequestration

- **Cultural Services**

Recreational value rather low compared to established parks

Options for Green Spaces on Brownfields	Urban Agriculture	Urban Woodland	Gardens	Sports/Leisure Pursuits	Venue for Public Events	Low Intervention Parks	Nature Experience Areas	Urban Wilderness
								
Habitat Services	+/-	+ / ++	+/-	+/-	-	++	++	++
Microclimate Regulation Services	+ / ++	++	++	+	+	++	++	+ / ++
Recreational Services	+/-	+ / ++	++	++	+	+ / ++	++	+/-

Options for reusing brownfields as green space and qualitative evaluation of their potentials to provide habitat services, micro-climatic regulation services and recreational services:  
 ++ “well suited”, + “suited”, - “unsuited”, +/- “detailed investigation of individual site necessary”.

(Mathey et al 2016)



# Brownfields and Urban Gardening

# Brownfields and Urban Gardening



## Benefits:

- Aesthetics: a nicely kept garden is more attractive than littered brownfields
- Eliminating breeding ground for vermin and mosquitoes
- Improvement of community image: people rather stay creates gathering places for the community
- Locally grown foods saves money and products could be sold to local markets
- Physical and mental health

# Brownfields and Urban Gardening



## Problems:

- Acquisition of brownfields
- Research of history about the brownfield
- **MOST IMPORTANT: Contamination**  
Lead, Arsenic, DDT, PAHs, PCBs....  
->requires cleanup

# Germany

## Brownfield situation

- Unused sites 150,000 to 176,000 hectares.
- loses green fields: 1.2 km<sup>2</sup>/day
- 14,700 local municipalities is empowered to allocate lands for industrial and commercial use.
- Industrial sites tend to be remote due to zoning laws



# Ronneberg

- A Germany Case Study on Former Uranium Mining Redevelopment
- Showing a similar situation with Zittau (Žitava)

- History





# Czech Republic

brownfield situation

8500-11700 brownfields with a total area of 27000-38000 ha



**Agrocentrum Ohrada Visky in its current state**  
Agro-tourism and relaxation

# Palladium

(City of Prague)

Josef barracks, 1922.



Began in 2005 - Opened in 2007.



Palladium shopping centre after revitalization

Source: [www.praguecityline.cz](http://www.praguecityline.cz)

# New Vítkovice (Moravian-Silesian region)

- Leisure time
- Housings
- Shopping
- Museums
- Galleries
- Research
- Facilities for university students.



Source: [www.dolnivitkovice.cz](http://www.dolnivitkovice.cz)

# EU

brownfield situation

500,000 hectares available for development



# United States

## brownfield situation

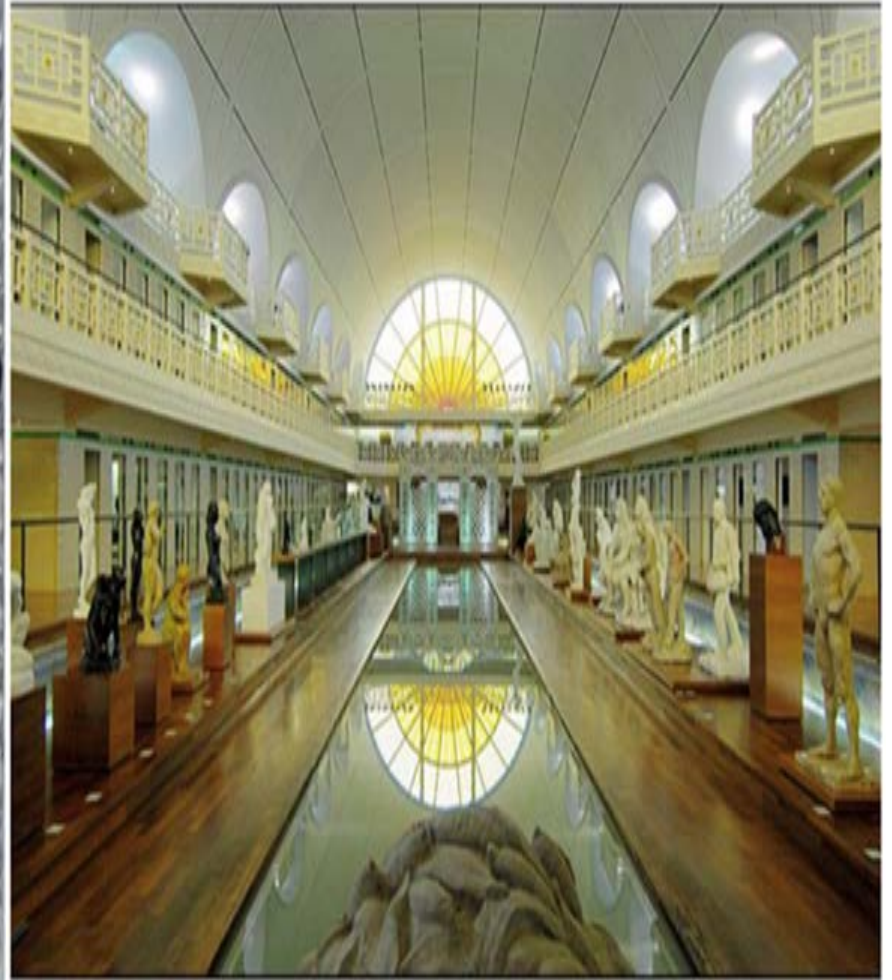
- Brownfields Law in 2002
- 425,000 brownfields
- 5 million acres of abandoned industrial land
- EPA  
National Brown Fields Act



# Britain, Roubaix



Old Spa



Museum of Art

# China, Kunming



# Military Area

- Ecological burdens
- Its elimination
- Financing
- The use
- Work schedule
- The impact on the region