



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

# FLORE

## Repository istituzionale dell'Università degli Studi di Firenze

### **Analysis of mine sites restoration strategies for soil and water resources protection**

Questa è la Versione finale referata (Post print/Accepted manuscript) della seguente pubblicazione:

*Original Citation:*

Analysis of mine sites restoration strategies for soil and water resources protection / Pacetti, Tommaso; Lompi, Marco; Caporali, Enrica. - ELETTRONICO. - (2021), pp. 14605-14605. (Intervento presentato al convegno EGU General Assembly 2021 tenutosi a Vienna (Austria) nel 19-30 April, 2021) [10.5194/egusphere-egu21-14605].

*Availability:*

This version is available at: 2158/1342133 since: 2023-10-31T21:26:38Z

*Publisher:*

Copernicus

*Published version:*

DOI: 10.5194/egusphere-egu21-14605

*Terms of use:*

Open Access

La pubblicazione è resa disponibile sotto le norme e i termini della licenza di deposito, secondo quanto stabilito dalla Policy per l'accesso aperto dell'Università degli Studi di Firenze (<https://www.sba.unifi.it/upload/policy-oa-2016-1.pdf>)

*Publisher copyright claim:*

Conformità alle politiche dell'editore / Compliance to publisher's policies

Questa versione della pubblicazione è conforme a quanto richiesto dalle politiche dell'editore in materia di copyright.

This version of the publication conforms to the publisher's copyright policies.

(Article begins on next page)



EGU21-14605  
<https://doi.org/10.5194/egusphere-egu21-14605>  
EGU General Assembly 2021  
© Author(s) 2021. This work is distributed under  
the Creative Commons Attribution 4.0 License.



# Analysis of mine sites restoration strategies for soil and water resources protection

Tommaso Pacetti et al. ▶

Mine reclamation represents an important environmental challenge due to the necessity of identifying the appropriate restoration measures to handle landscape change and minimize the associated environmental impacts. Water management plays a key role for determining strategies to reduce these impacts, e.g. necessity of restoring natural drainage patterns, implementing flood control measures and restoring hydrological natural behaviour. Fundamental aspects are certainly represented by the runoff variation and the proper sediment management.

The objective of this study is to give quantitative evidence on the effectiveness of decommissioning strategies on water and sediment management. The selected case study is a former lignite mining site located in San Cipriano catchment (Tuscany, central Italy) that include a reservoir severely hit by silting problems. The Soil Water Assessment Tool (SWAT) was used to analyse current situation and to implement different LULC changes analysis. Since hydrometric gauge stations were not available in the catchment, the model calibration focused on sediment transport using observed silting volume in the reservoir, which has been estimated thanks to multiple bathymetric campaigns carried out over the years. Two environmental restoration scenarios have been analysed: the first is focused on the land use change with the afforestation of the former mining site with native plants; the second is a wider landscape restoration project that also includes river bodies rehabilitation.

Results highlight a strong reduction of sediment yield and a decrease in water yield associated to the restoration intervention. This is mainly due to the effects of reforestation that influence the hydrological cycle inducing an increase of water storage in the soil and determine a strong reduction of sediment input to the reservoir. The model results represent a valuable decision support tool that help understanding the hydrological impacts of LULC changes, supporting the identification of the most appropriate mining decommissioning strategies.

**How to cite:** Pacetti, T., Lompi, M., and Caporali, E.: Analysis of mine sites restoration strategies for soil and water resources protection, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-14605, <https://doi.org/10.5194/egusphere-egu21-14605>, 2021.

