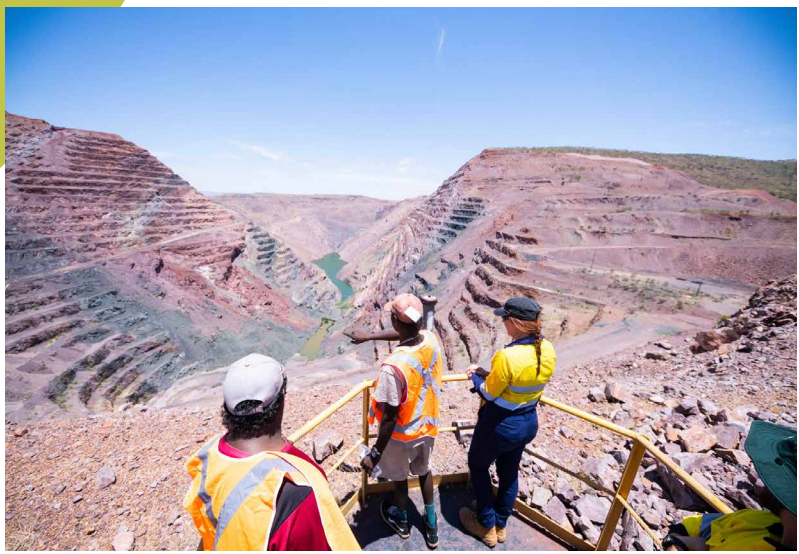


Photo credit: Timbee Photography

SOCIETY FOR ECOLOGICAL RESTORATION

INTERNATIONAL PRINCIPLES AND STANDARDS FOR THE ECOLOGICAL RESTORATION AND RECOVERY OF MINE SITES

KEY CONCEPTS SUMMARY

The International Principles and Standards for the Ecological Restoration and Recovery of Mine Sites (the Standards) is a framework for socially and environmentally responsible ecological restoration in global mining activities. The Standards aim for improved outcomes in mined lands that minimize the recovery gap and where possible achieve net gain for nature, natural assets, and communities.

This summary provides an abbreviated outline and introduction to the full SER Mine Site Restoration Standards. The complete open-access document is available at www.ser.org/mining.

The Standards outline:

- How to adopt the key principles and achieve an integrated restoration program throughout life of mine.
- How to move towards a culture of best and future practice within government and industry.
- How to manage the significant challenges faced in mine site restoration and implement strategies that achieve the highest level of recovery possible.

The tools, concepts and case studies in these Standards will guide companies and governments to implement more effective restoration projects that deliver greater environmental benefits while enabling local communities to comprehensively engage with the mining industry.

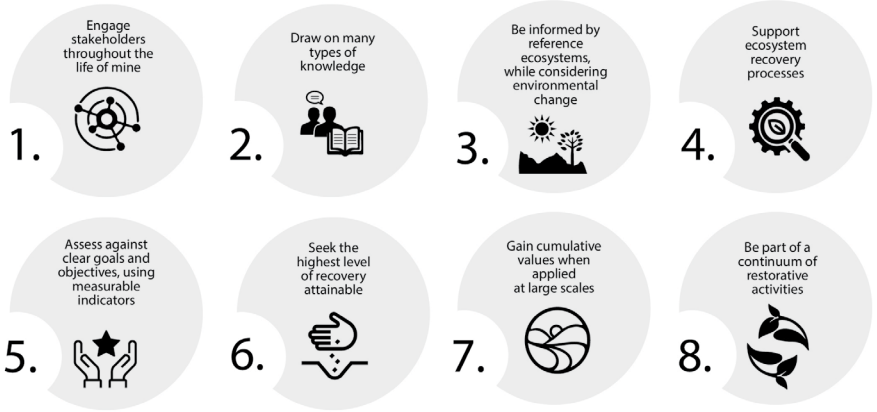
INTRODUCTION

The Standards are designed to inspire and drive improved outcomes in mining landscapes and are in tandem with the global need for protecting and restoring nature. This comes at a time of unparalleled global human impacts where climate change, land degradation, and biodiversity loss threaten the ecological fabric of the planet.

By demonstrating leadership in protecting and restoring the environments in which they operate, mining companies can enhance their social license to operate. The Standards support the mining industry and stakeholders, including Indigenous peoples and local communities to address mining-specific challenges in ecological restoration.

Restoration after mining is highly complex. The Standards emphasize that achieving the highest possible ecological outcomes requires site specific solutions. Adopting the Standards can minimize the recovery gap and move towards net gain for nature and people.

Eight Principles Underpinning Restoration of Ecosystems after Mining



INTRODUCTION (cont)

Ingenuity, knowledge investment, a supportive corporate ethos based on a culture of continuous improvement, and project-wide community involvement are key to achieving successful restoration after mining.

The early adoption of the Standards by industry can reduce environmental, financial, and corporate risk in achieving site relinquishment by demonstrating the highest possible company commitment to environmental repair.

Early restoration interventions will increase natural capital, enable responses to climate change, benefit local communities, and recover biodiversity, including threatened and culturally significant species. For regulatory authorities, adoption of the Standards will ensure that mined lands are managed through life-of-mine to the highest environmental level to minimize societal and political risks associated with poor mine closure outcomes.

These Standards align with the UN Decade on Ecosystem Restoration, the UN Sustainable Development Goals, the Mitigation Hierarchy, and international best practice in ecological restoration. They represent a living document that will evolve and develop as community and environmental expectations and awareness of mining operations grow, and as technology and understanding of mine site restoration improves.

The Standards provide a blueprint for ensuring ecological restoration achieves its full potential in delivering social and environmental equity and, ultimately, long-lasting economic benefits and outcomes, while recognizing that the potential for ecological restoration should never be used as a justification for destroying or damaging native ecosystems.

The Mine Site Restoration Standards:

- Present a robust and evidence-based framework to guide restoration projects toward achieving intended goals
- Address restoration challenges including:
    - Effective design and implementation
    - Building and sustaining community trust founded on genuine and ongoing engagement
    - Minimizing impacts by adoption of the Mitigation Hierarchy
    - Accounting for complex ecosystem dynamics within a geologically variable landscape
    - Accounting for climate change in restoration planning and implementation
    - Identification of reference models
    - Adoption of knowledge and technology in striving for best practice
- Highlight the role of ecological restoration of mined ecosystems for connecting social, community, landscape, and sustainability goals
- Promote the establishment of the trust model between industry, government, research and the community
- Provide guidance for developing and achieving performance measures based on an established trajectory
- Develop a culture of continuous improvement that routinely reviews practices and planning, implementation, and monitoring activities

In addition, the Standards:

- Provide case studies that demonstrate leading practices
- Discuss pertinent issues and explanatory concepts related to mine site restoration
- Include a glossary of terminology to modernize and harmonize post-mining restoration terminology

PRINCIPLE 1

Engage stakeholders throughout the life of mine

Stakeholders are consulted throughout life of mine where companies have an ongoing and genuine commitment to open and informed consultation matched by a preparedness to alter mine planning in response to stakeholder concerns.

PRINCIPLE 2

Draw on many types of knowledge

Evidence-based decisions founded on science, Indigenous and Local Knowledge, and practitioner experience is the foundation of robust, effective and resilient restoration outcomes.

PRINCIPLE 3

Be informed by reference ecosystems, while considering environmental change

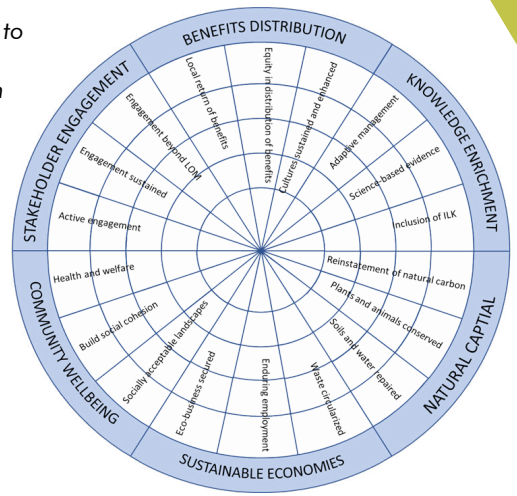
When mining occurs in native ecosystems companies restore to a target native reference and develop reference models for planning and communicating a shared vision.

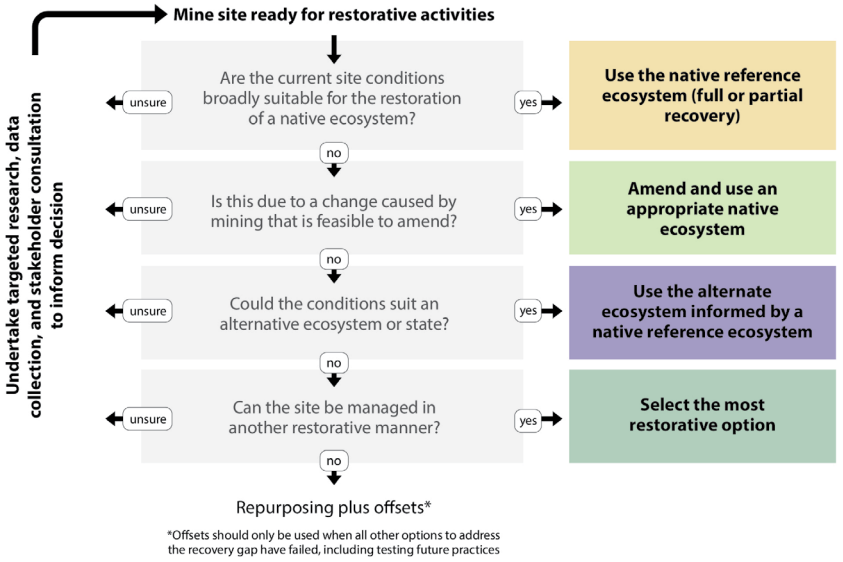
PRINCIPLE 4

Support ecosystem recovery processes

Biological processes and exchanges are reinstated in the context of the surrounding ecosystem, with interventions undertaken when and where required to compensate for the loss of natural recovery potential.

*Example of a **Social Benefits Wheel** to assist in tracking how a mine restoration program is attaining social development targets and goals. See Principle 1.*





*This **Decision Tree** can assist selection of appropriate native reference ecosystems for restoration projects. See Principle 3.*

PRINCIPLE 5

Assess against clear goals and objectives, using measurable indicators

Restoration goals are informed by and measured against evidence-based parameters.

PRINCIPLE 6

Seek the highest level of recovery attainable

Mining companies adopt a policy of building restoration capacity at the commencement of mining including progressive restoration, continuous improvement, and genuine adaptive management that requires technically competent and appropriately trained employees.

PRINCIPLE 7

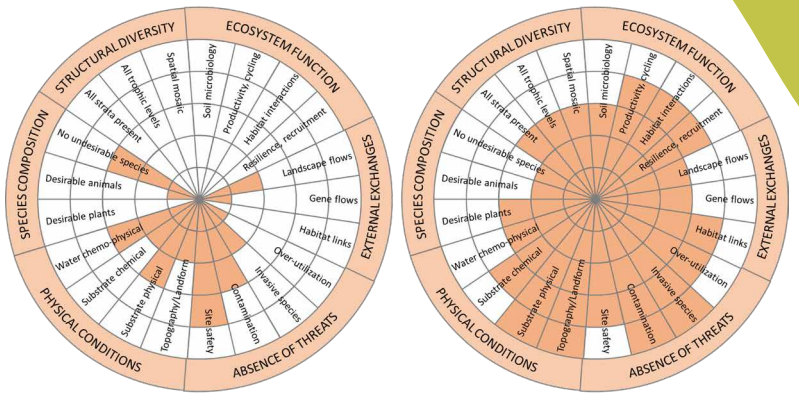
Gain cumulative values when applied at large scales

Integrate whole-of-mine restoration within regional and landscape-scale ecosystems and restoration activities, including sharing of restoration lessons and best practice.

PRINCIPLE 8

Be part of a continuum of restorative activities

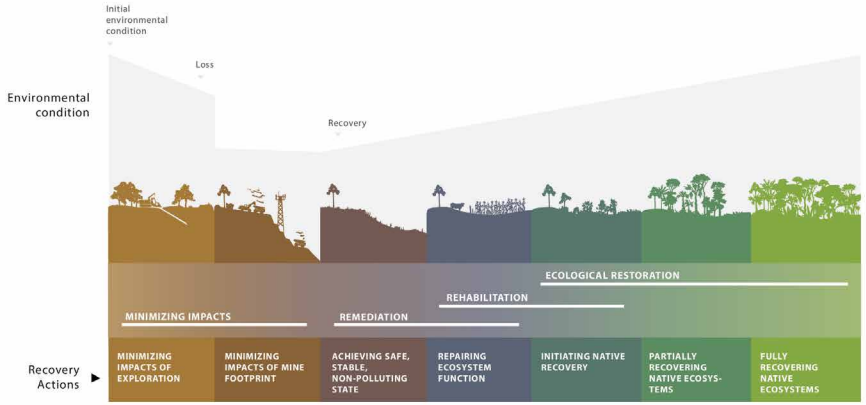
Ecological restoration and allied activities are integrated into a sustainable model to deliver maximum improvement in environmental condition.



Post-mining baseline

10 years later

*The **Ecological Recovery Wheel** and **Five Star Rating** system in the Standards provides a visually compelling yet scientifically robust approach to assessing progress towards a reference model. See Principle 6.*



*The **Recovery Trajectory** for mine sites illustrates how to minimize mining impacts and how implementation at all stages of the life of mine can contribute towards optimizing ecological outcomes. See Principle 8.*

FUTURE PRACTICE

Future practice is the acknowledgment that aspects of science, Indigenous and Local Knowledge, on-site learning, and other knowledge sources that are not currently known or understood will inform, influence, and improve restoration practice in the future including the cost-effectiveness of restoration. Companies adopting future practice will build monitoring and review into company policy that enables evidence-based management and practices to develop improved outcomes, even when those changes are currently unknown.

Mine site restoration, before (left) and after (below), India.

Photo credit: Dr. Evr Raju

CONCLUSION

These Standards provide a framework for recovery of ecosystems through high impact ecological restoration that benefits the mining industry, the community in which mining operates, and nature. This begins with the mitigation hierarchy to avoid impacting irreplaceable, unique, or high value natural and cultural assets. Where mining does occur, practices guided by the eight principles in the Standards will minimize the recovery gap and return functional, biodiverse, and climate resilient ecosystems that meet community expectations.

Communities and regulatory agencies are increasingly likely to pressure companies to engage in offsite recovery of legacy mines and other adjacent landscapes to create ecological and social net gain by restoring beyond the footprint of the mined area. Innovations in mine site restoration can also help improve restoration in other highly degraded landscapes, especially through two-way learning and proactive knowledge sharing.

Globally, the impact of mining is profound, requiring an equally profound investment in mine site restoration. These Standards provide a critical tool to enable the mining industry to harness its technological capacity and financial resources to implement not only remediation and reclamation, but also ecological restoration at scale, thus enhancing both the environment and human health and wellbeing.

STANDARDS OF PRACTICE FOR PLANNING AND IMPLEMENTING ECOLOGICAL RESTORATION OF MINED LAND

The Standards provide a comprehensive set of standard practices across four project phases throughout the life of mine:

- Planning and design
- Implementation
- Monitoring, documentation, evaluation, and reporting
- Ongoing activities and maintenance

The standards of practice can be adapted to suit the complexity of mined materials, altered topography, environmental and cultural challenges, and site specific regulatory issues.

Photo credit: Timbee Photography

SER SOCIETY FOR ECOLOGICAL RESTORATION

For more than three decades, the Society for Ecological Restoration (SER) has given voice to the field of ecological restoration and provided leadership in all aspects of its development. We are a dynamic global network of over 4,400 members who foster the exchange of knowledge and expertise among ecological restoration practitioners and scientists from diverse disciplines and backgrounds. In addition to communicating leading-edge tools, technologies and scientific findings, SER actively promotes best practices and effective restoration policy around the world.

We are working to ensure that ecological restoration is recognized and utilized as a fundamental component of global conservation, biodiversity, and sustainable development programs, and that ecological restoration projects are designed and implemented in a way that provides people with the opportunity to not only repair ecological damage, but also improve the human condition.

To learn more and get involved with SER, visit: www.ser.org

AUTHORS

Renee E Young, Australia
ARC Centre for Mine Site Restoration, Curtin University; The Western Australian Biodiversity Science Institute

George D Gann, USA
Society for Ecological Restoration

Bethanie Walder, USA
Society for Ecological Restoration

Junguo Liu, China
North China University of Water Resources and Electric Power; Southern University of Science and Technology; Society for Ecological Rehabilitation of Beijing

Wenhui Cui, China
Southern University of Science and Technology

Vernon Newton, Australia
Heidelberg Cement, Hanson Construction Materials

Cara R. Nelson, USA,
University of Montana; IUCN Commission on Ecosystem Management, Gland, Switzerland

Natalie Tashe, Canada
EcoTash

David Jasper, Australia
Stantec

Fernando A.O. Silveira, Brazil
Department of Genetics, Ecology and Evolution, Universidade Federal de Minas Gerais

Peter J. Carrick, South Africa
Plant Conservation Unit, University of Cape Town

Tove Haagland, Sweden
Ecogain

Sarah Carlse, Sweden
Ecogain

Kingsley Dixon, Australia
ARC Centre for Mine Site Restoration, Curtin University

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The full document can be download at www.ser.org/mining

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ARC Centre for Mine Site Restoration
An Industrial Transformation Training Centre

Curtin University

SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY 南方科技大学