

THOUGHT LEADERSHIP

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Reconciling Mining with Biodiversity Conservation

The mitigation hierarchy as a global standard for sustainable mining

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[A recent White House report](#) stresses the need to secure reliable and sustainable supplies of [critical minerals and metals](#) to ensure resilience across U.S. manufacturing and defense needs. To do so, the Biden Administration recommends expanding sustainable domestic production and processing capacity while developing and fostering 21st century sustainability standards for the extraction and processing of critical minerals.

The mitigation hierarchy framework (Figure 1) has become the global standard for managing risks and potential impacts to biodiversity and ecosystem services. [Formalized by the International Finance Corporation in 2012](#), it has now been broadly adopted by financial institutions, industries, governments, and NGOs, and the two main bodies responsible for establishing best mining practices—the [International Council on Mining and Metals](#) (ICMM) and the [Initiative for Responsible Mining Assurance](#) (IRMA)—require its adoption. Because the recent White House report highlights the role of IRMA as a model for responsible mining, the mitigation hierarchy framework is expected to gain momentum in the U.S. and abroad as a key tool to ensure sustainable mining practices.

actions to avoid impacts, and where avoidance is not possible, to minimize impacts. When impacts occur, the framework directs users to restore affected resources and services, and where significant residual impacts remain, it identifies the need for offsets. Preventive actions (avoidance and minimization) are preferred over remediative ones (restoration and offsets), given that there are often fewer options and higher risks further along the mitigation hierarchy. The mitigation hierarchy is not a one-way linear process. Rather, it entails both feedback and adaptive management to optimize investments.

The Mitigation Hierarchy Framework

[The mitigation hierarchy framework's](#) overarching goal is to achieve no net loss and preferably a net gain in biodiversity. It comprises a sequence of

Challenges to Applying the Framework

Applying the mitigation hierarchy raises the following scientific, technical, and communication challenges:

- Assessing or predicting impacts and measuring losses or gains in biodiversity and ecosystem services are complex endeavors lacking standardized methods.

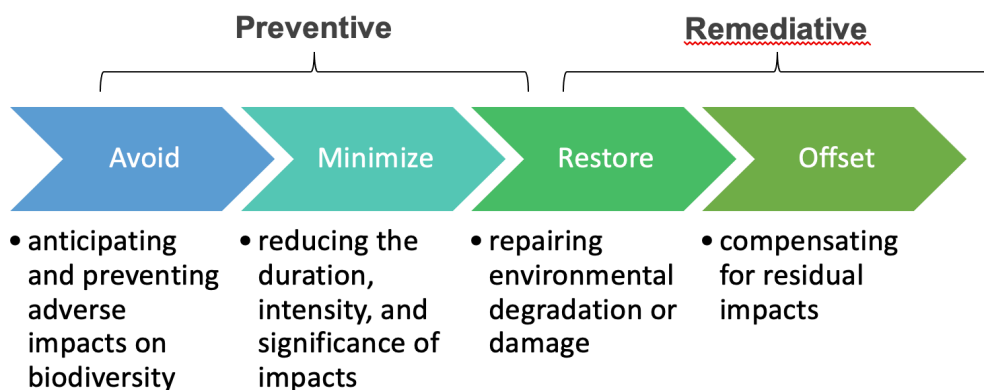


Figure 1: The mitigation hierarchy framework

- Implementing the framework involves important technical challenges, [including infrastructure planning, ecosystem management, and the use of nature-based solutions.](#)
- Communicating mitigation options along with technical, economic, and political constraints is not always straightforward because there are no standardized reporting guidelines. For instance, [even though ICMM members are required to apply the mitigation hierarchy with the ambition of achieving no net loss of biodiversity,](#) only half of its current 28 member companies mention the framework in their most recent sustainability or annual reports.

Addressing these challenges is crucial to ensure sustainable mining practices and environmental compliance. Since the White House report recommends conditioning economic incentives to companies with strong performance on environmental compliance, while ensuring regular environmental inspections, compliance is expected to be more strongly enforced and incentivized in the coming years.

How Exponent Can Help

With more than 50 years of experience and a large body of industry experts in ecological, environmental, and data sciences, Exponent can assist clients in the successful application of the mitigation hierarchy framework. Exponent's interdisciplinary expertise helps clients rigorously evaluate different mitigation options, develop strategies to implement those options, and systematically report on implementation of the framework. As companies transform operations and corporate culture to meet sustainability targets set by international standards, Exponent can help minimize

environmental, transitional, and reputational risk. By facilitating compliance with national and international standards, we can also help improve ESG ratings and expand access to financing.



Rodolfo Jaffé, Ph.D.

Ecological & Biological Sciences
Senior Scientist
Bellevue
(425) 519-8746
rjaffe@exponent.com



Jason James, Ph.D., APSS

Environmental & Earth Sciences
Senior Scientist
Bellevue
(425) 519-8740
jamesj@exponent.com



Karen J. Murray, Ph.D.

Environmental & Earth Sciences
Managing Scientist
Maynard
(978) 461-4610
kmurray@exponent.com



Bryan S. Pitts, P.E.

Environmental & Earth Sciences
Managing Engineer
Maynard
(978) 461-4641
bpitts@exponent.com

Alexandria | Atlanta | Austin | Bellevue | Bowie | Chicago | Denver | Detroit | Houston | Irvine | Los Angeles | Maynard | Menlo Park | Miami | Natick | New York | Oakland | Pasadena | Philadelphia | Phoenix | Sacramento | Seattle | Warrenton | Washington