IUCN
RIO DOCE PANEL
INDEPENDENT SCIENTIFIC AND TECHNICAL ADVISORY PANEL

SOURCE-TO-SEA AND LANDSCAPE APPROACHES

INTEGRATING WATER QUALITY AND BIODIVERSITY CONSERVATION TOWARDS THE RESTORATION OF THE RIO DOCE WATERSHED

With an area of 86,715 km^2 and home to 3.2 million inhabitants, the Rio Doce watershed represents the most important hydrographic watershed in southeast Brazil. Since the Fundão dam failure, substantial investments in technical-scientific knowledge and financial resources have been applied to mitigate its impacts. However, the river does not exist in isolation, so the restoration should consider the surrounding landscape, including the adjacent coastal and marine areas. Successful restoration also requires an integrative approach that takes into account all the environmental, social, financial, economic, and cultural aspects of this unique region.

In this Technical Report, the Rio Doce Panel proposes that the Renova Foundation and other stakeholder organisations and decision-makers integrate source-to-sea and landscape approaches with existing strategies to better evaluate the interactions between water quality and biodiversity conservation along with the social, economic, cultural and environmental elements that are critical for the watershed and associated coastal and marine areas, taking a long-term perspective. This combined approach will lead all the pertinent actors in the watershed to better understand the interconnections between governance, people, and space, and will facilitate the determination of priorities, resource allocation, and planning for the long-term.

WHAT IS THE SOURCE-TO SEA FRAMEWORK?

Source-to-sea is a comprehensive approach used to analyse a watershed at its highest level of interdependence and ecological influence. It expresses the scale and the elements needed to deal with complex systems of governance and vast territories (Granit et. al, 2017)

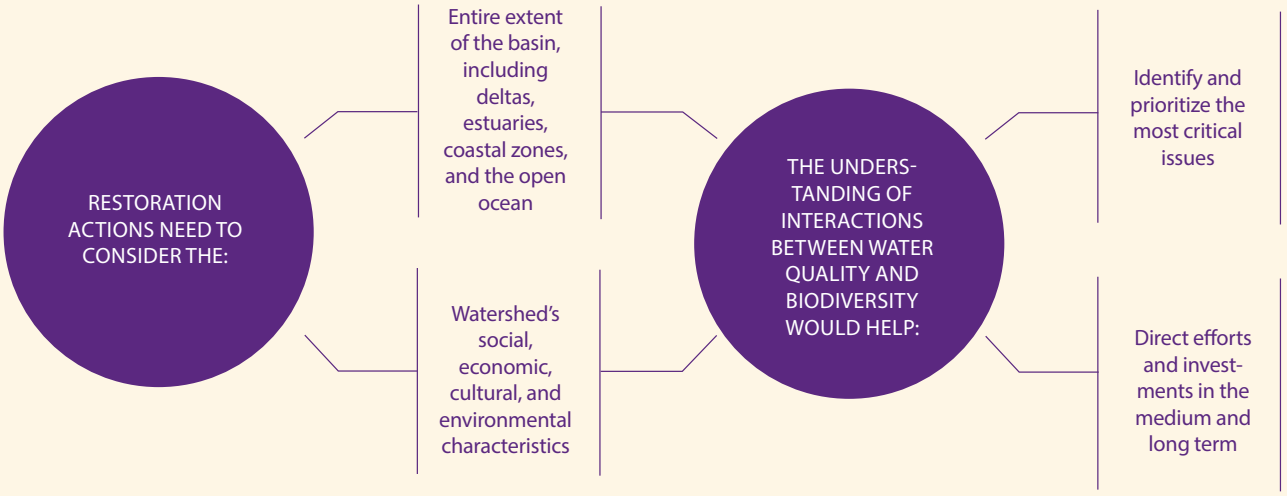
WHAT IS THE LANDSCAPE APPROACH?

An integrated landscape approach seeks to understand the interrelation between the physical and environmental aspects and the social, economic and cultural factors that determine its nature and trends. The approach offers a framework for balancing competing demands and developing policies and practices that allow for multiple lands uses with the engagement of different stakeholders.

WHAT SHOULD BE DONE

To restore the landscape and the source-to-sea system as a whole to a healthier, more sustainable state than that which existed before the disaster and to contribute to the resilience of the natural environment and local livelihoods, it is necessary to:

- Integrate actions within the watershed, emphasising not only the essential flow of water but also actions starting from the headwaters – continuing from the river's mouth and expanding to the adjacent coastal and marine areas.
- The efforts must include not only processes that occur within the river channel but must also reflect the social, economic, cultural and environmental features of the entire watershed to be an integrated landscape and multiscale approach.
- Have a clear definition of the objectives, collaborative participation, transdisciplinary/cross-sectoral approaches, adaptive management, and an iteractive process to address the inherent complexity within the system in order to design and implement plans for the future.



RIO DOCE FACTS

1. The National Water Resources Policy establishes the watershed as the planning and management unit for water resources.

2. An Integrated Water Resources Plan (PIRH - Plano Integrado de Recursos Hídricos) has been drawn up for the Rio Doce watershed, and consists in a system of participatory decision-making for integrated water resources management.

3. The PIRH details the actions and investments needed to meet its objectives in each of the nine sub-watersheds that form the Rio Doce watershed, including the creation of additional protected areas and programmes of basic sanitation and emergency preparedness.

4. Since the Fundão Dam failure in 2015, an emergency monitoring programme has been implemented in the impacted rivers focused on the analyses of water and sediment samples along the Rio Doce. The results of this programme are disclosed to the public on the platform Monitoring Rio Doce.

5. From the perspective of marine biodiversity conservation, concern has been raised about the impact of the Fundão disaster tailings plume on the Rio Doce estuary and the adjacent marine area, particularly on the protected areas.

6. Similar analyses have been undertaken since 2018 by the Rio Doce Mar Network (Rede Rio Doce Mar, or RRDM), which implements the Aquatic Biodiversity Monitoring Programme for Environmental Area 1 (PMBA) and provides information regarding physical, chemical and biotic characteristics of the studied environments.

7. A landscape analysis focused primarily on terrestrial resources and social and economic features has been applied to selected areas in the Rio Doce by the Renova Foundation

8. Despite the improvements recorded, the water quality in different areas of the Rio Doce watershed, and the sediments in the estuarine areas, are still a cause for concern. Some studies show that current conditions are capable of affecting the aquatic biota's richness and diversity as compared to areas that have not been impacted by the tailings.

9. Currently there are restrictions in force on fishing in the affected areas of the Rio Doce in MG and a ban on fishing in the coastal waters up to 20m in depth between Barro do Riacho (Aracruz) and Degredo (Linhares) in Espírito Santo. A more detailed analysis is contained in the Panel's Issue Paper No.2, The fishing ban after the Fundão Dam Failure.

Recommendations

Aiming to contribute to ensure an effective restoration process for the watershed as a whole, the Rio Doce Panel proposes the following recommendations:

1• Adopt a source-to-sea framework and an integrated landscape approach in the Rio Doce watershed restoration efforts.

2• Ensure a long-term comprehensive evaluation of the systematic Quali-Quantitative Monitoring Programme of Water and Sediment of the Rio Doce watershed (PMQQS) data to prioritise actions for the continual improvement of Rio Doce's environmental conditions.

3• Use the existing water monitoring programme to build the capacity in the region to monitor potential impacts on water quality and biota associated with the emergence of synergistic pollutant compounds.

4• Strengthen technical support to municipalities for the implementation of a comprehensive, innovative and modular basic sanitation programme for the watershed.

5• Expand the existing monitoring plan in order to inform and prioritise biodiversity restoration activities.

Read the full report: https://doi.org/10.2305/IUCN.CH.2021.07.en
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