

# **Nature as a Design Partner: Natural and Hybrid Infrastructure for Climate Resilience**

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Natural infrastructure, such as wetlands, dunes, reefs, and urban green spaces, offers transformative opportunities for engineering applications, particularly in coastal, port, and urban contexts increasingly exposed to climate-driven hazards. Unlike more traditional gray infrastructure, natural infrastructure can deliver co-benefits including flood attenuation, erosion control, biodiversity enhancement, and climate adaptation. Nature-based solutions have also been proposed as more cost-effective and adaptive over time. In coastal zones, they contribute to wave attenuation, shoreline stabilization, and ecosystem services; in urban environments, they can support stormwater management, heat reduction, habitat creation, and recreational opportunities. However, widespread implementation remains limited due to persistent uncertainties around long-term performance, scalability, maintenance, regulatory acceptance, and bankability, among other factors. At the same time, significant opportunities lie in advancing hybrid approaches that integrate natural and gray infrastructure to enhance system resilience. This paper discusses current research and practice at the intersection of natural infrastructure and engineering, with examples and recent advances. As climate risks escalate, the integration of natural infrastructure into mainstream engineering represents both a critical challenge and a promising frontier.