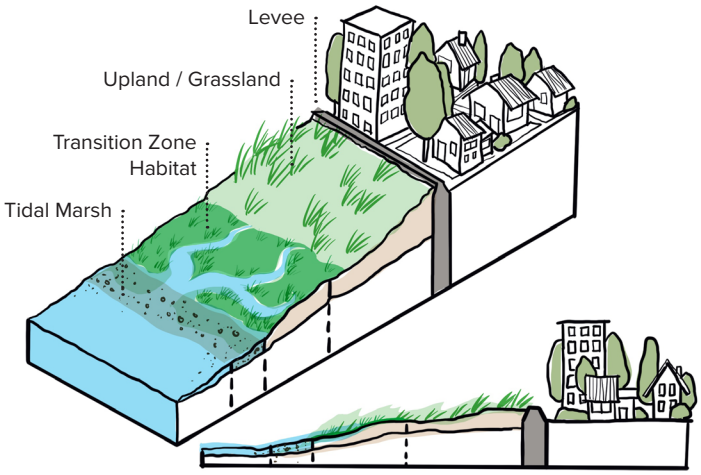
BUILDING THE NEXT GENERATION OF RESILIENT INFRASTRUCTURE

CONSERVATION INTERNATIONAL

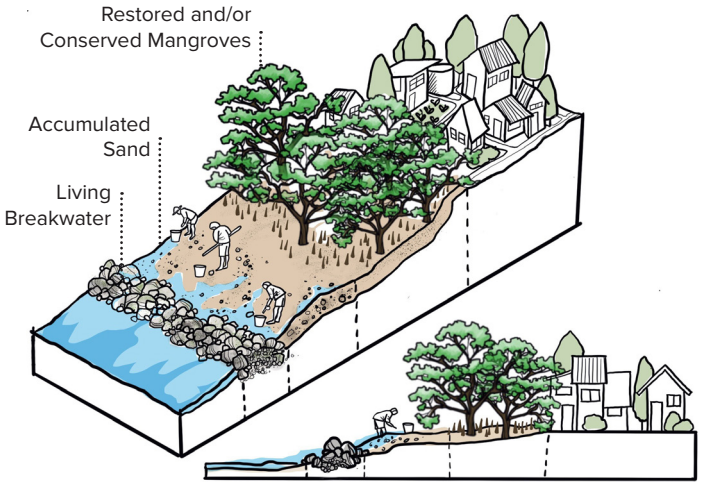
GREEN-GRAY INFRASTRUCTURE

GREEN-GRAY INFRASTRUCTURE combines conservation and/or restoration of ecosystems with the selective use of conventional engineering approaches to provide people with solutions that deliver climate change resilience and adaptation benefits. By blending "green" conservation with "gray" engineering techniques, communities can incorporate the benefits of both approaches while minimizing the limitations of using either exclusively. The green-gray infrastructure design approach can apply in coastal, freshwater or terrestrial settings.

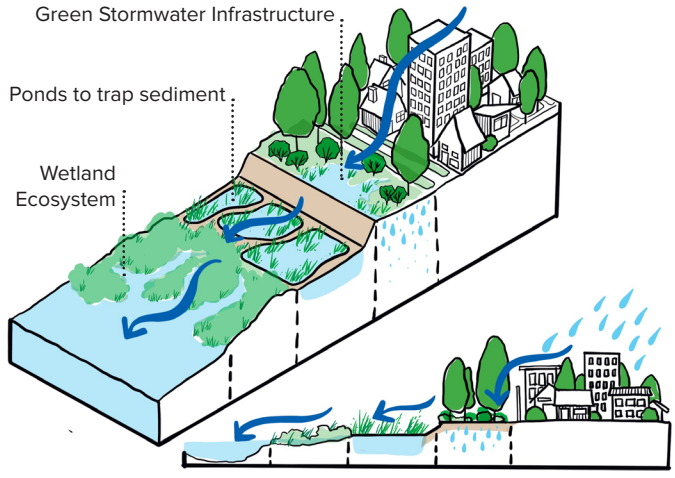
COASTAL GREEN-GRAY EXAMPLES



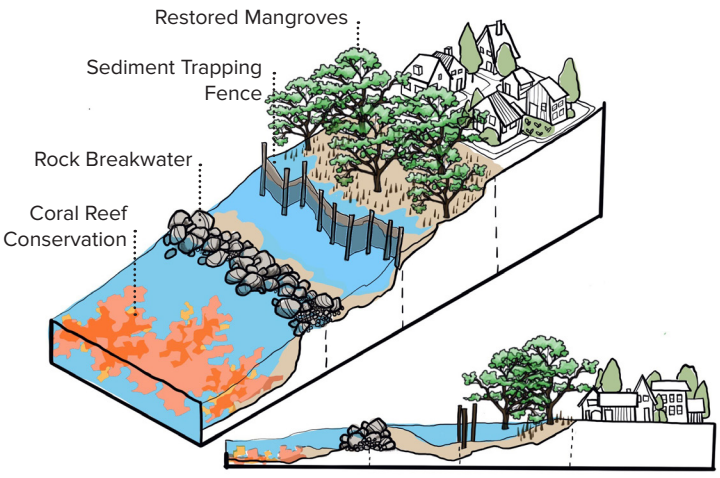
HORIZONTAL LEVEES integrate coastal ecosystem restoration and/or conservation with traditional levee design to achieve greater protection from floods and sea level rise than if either solution was applied alone.



LIVING BREAKWATERS reduce wave energy, facilitate sediment accumulation and promote natural colonization by shellfish to diversify local livelihoods.

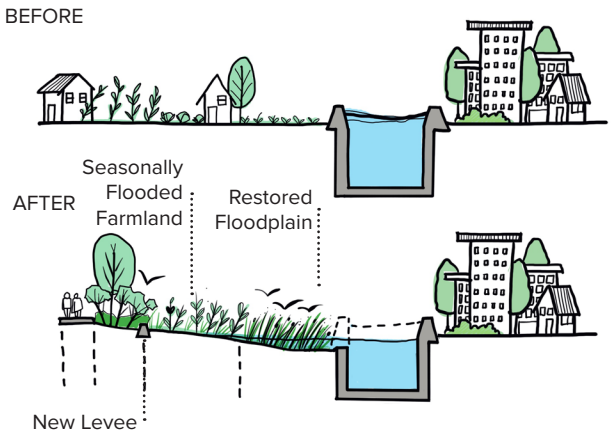


CONSTRUCTED WETLANDS use natural processes to clean stormwater, graywater and/or wastewater, resulting in improved habitat and biodiversity benefits. Stormwater wetlands clean runoff from urban spaces, reduce flooding and create spaces for people to access nature.

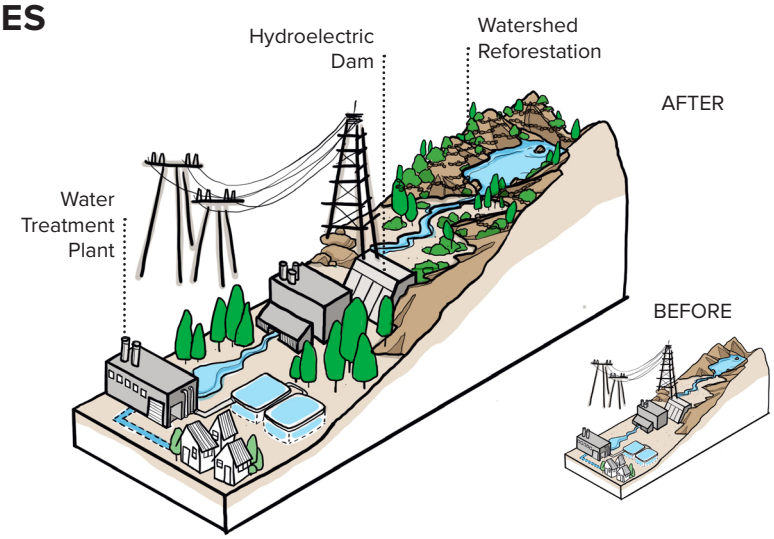


BREAKWATERS reduce wave energy to buffer impacts of weather events to vulnerable communities and facilitate sediment accumulation for ecosystem restoration, such as for mangroves.

FRESHWATER GREEN-GRAY EXAMPLES

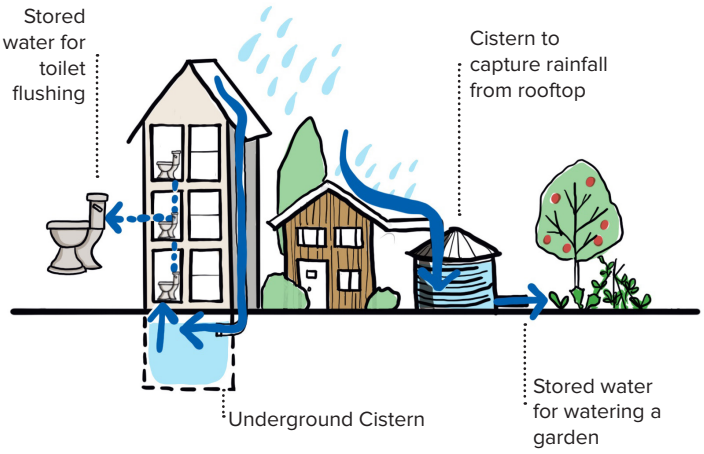


RIVER RESTORATION FOR FLOOD MANAGEMENT restores hydrologic function through a variety of approaches, such as building terraced levees that reduce flooding, create habitat, improve water quality, and provide spaces for people to access nature.

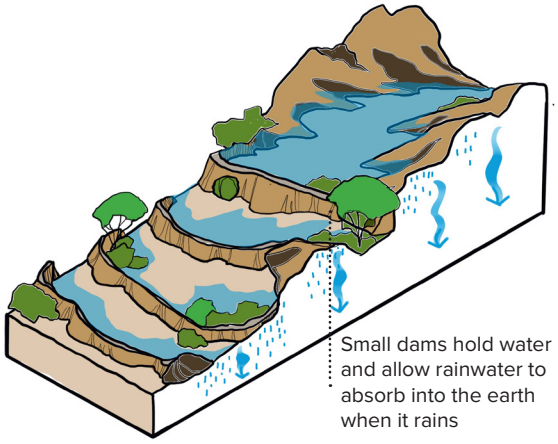


REFORESTATION AND FOREST CONSERVATION reduce sedimentation and help regulate flows to hydropower plants, while also making water cleaner and cheaper for downstream water treatment plants to clean for communities to drink.

TERRESTRIAL GREEN-GRAY EXAMPLES



RAINWATER HARVESTING is the practice of collecting and using rainwater from roofs and other artificial surfaces. Used by communities for millennia, rainwater harvesting is becoming more common today as people look for ways to increase local resilience and use all water resources more efficiently.



INFILTRATION AND TREATMENT-BASED LANDSCAPES slow overland flow, increase groundwater infiltration to recharge aquifers, manage flood risk and reduce erosion.

What are the benefits of using GREEN-GRAY Infrastructure?

Help communities adapt to (and mitigate) climate change through enhancing:

- Disaster risk reduction (e.g., flood management, coastal protection)
- Water security (for drinking, agriculture, industry)
- Water quality (via filtration, biochemical purification, settling, dilution)
- Supplemental livelihoods (e.g., gathering, cultivating, fibers)
- Carbon storage (in living biomass) and sequestration (in sediments)
- Habitats that support biodiversity

Accounting for the ecosystem services provided by restored and/or conserved ecosystems in a green-gray infrastructure project often result in a more cost-effective project when compared to a purely gray infrastructure solution. Including green-gray approaches in disaster risk reduction projects can improve community resilience by providing organizational development and supplemental livelihoods.

For more information about green-gray infrastructure projects at Conservation International please contact:

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