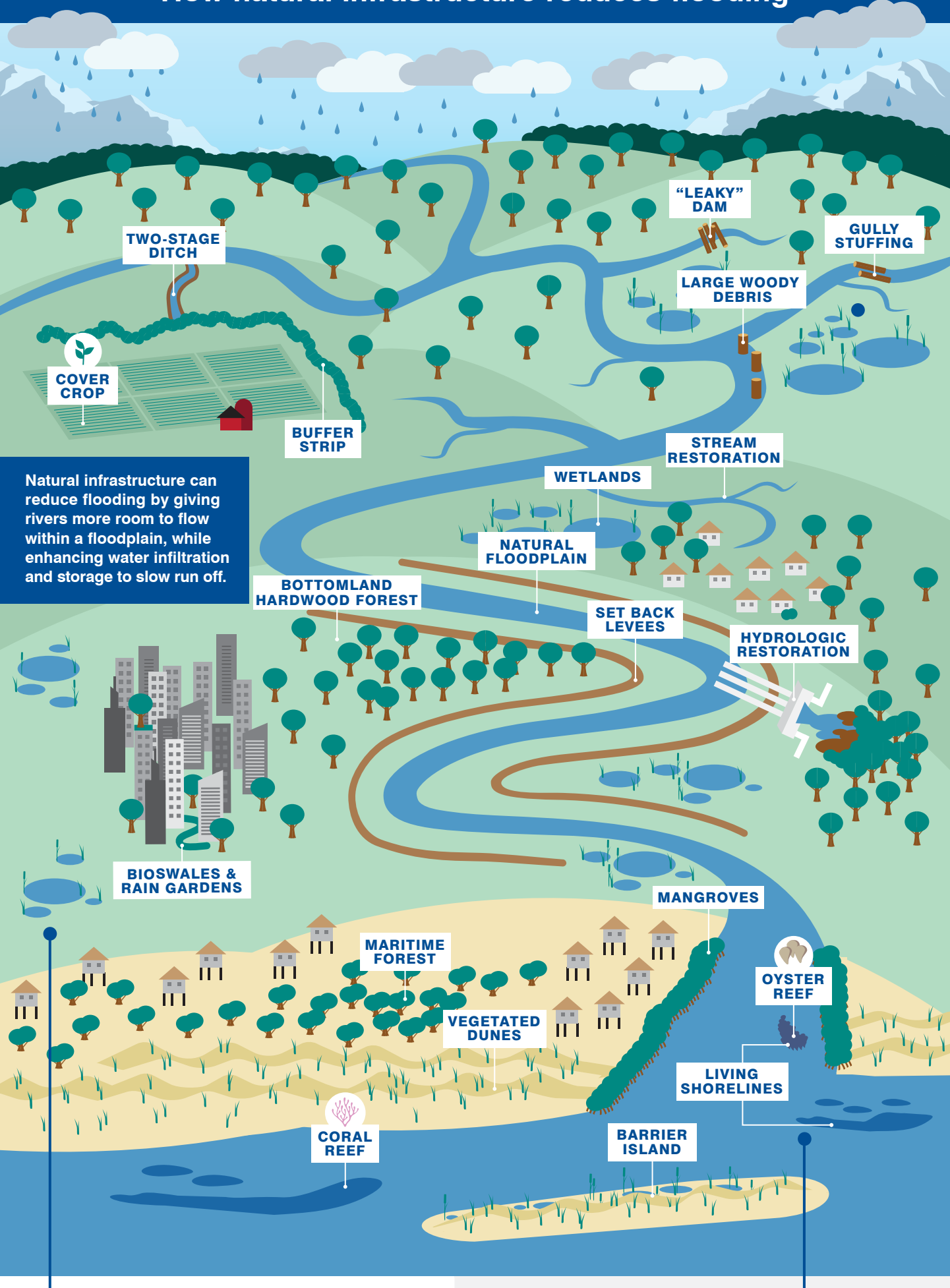
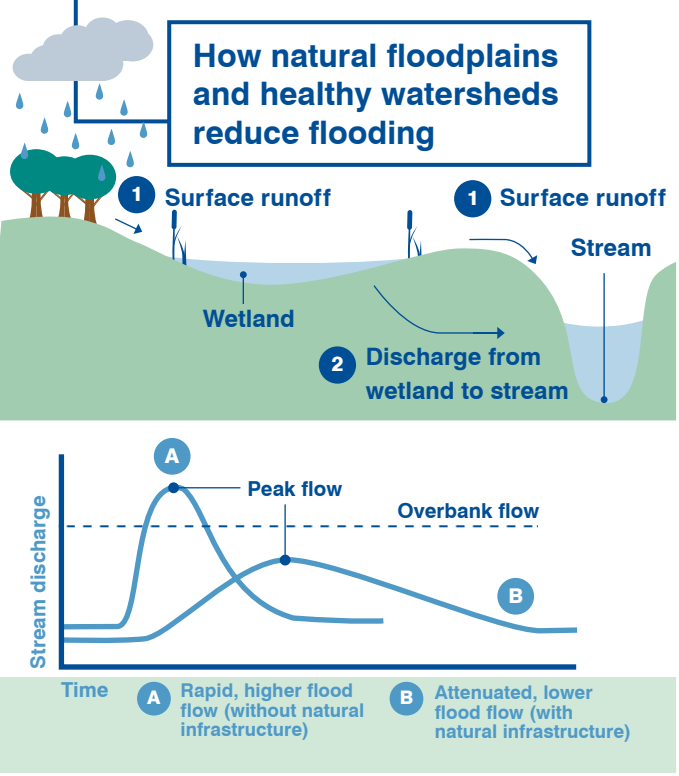
How natural infrastructure reduces flooding

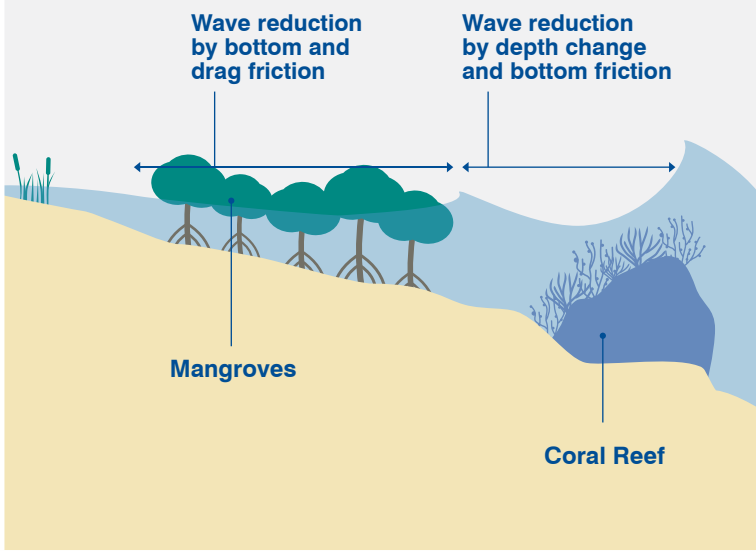


Natural infrastructure can reduce flooding by giving rivers more room to flow within a floodplain, while enhancing water infiltration and storage to slow run off.

How natural floodplains and healthy watersheds reduce flooding



How natural infrastructure reduces wave heights and surge



Natural infrastructure examples and benefits

Barrier islands: offshore sand islands that absorb wave energy to reduce erosion.

Bioswales and rain gardens: low-lying vegetated areas that slow and cleanse urban runoff.

Cover crops: planted agricultural fields to increase soil permeability and slow surface runoff.

Floodplain restoration: Restoration approach that puts the stream channel and floodplain at or near historical elevations and locations, benefitting water quality, increasing absorption and providing wildlife habitat.

Gully stuffing: logs and woody debris placed in ditches, gullies or channels to slow the flow of water and trap sediment.

Hydrologic restoration: Structures, such as sediment and freshwater diversions, that reconnect rivers to wetlands to restore hydrology, deliver sediment and build and maintain coastal land.

Large woody debris: wooden structures or tree stumps placed in streams to decrease stream velocity near river banks and reduce erosion of banks.

Leaky dams: woody debris placed across a stream or channel that allows fish passage, provides habitat, and disperses and slows flow of water

Mangroves: coastal shrubs/trees with dense roots and stems that reduce wave energy and height, trap storm debris and slow inland transfer of water.

Maritime forests: dense coastal vegetation that reduces wind and wave energy and captures debris to buffer inland areas from storm damages.

Oyster, shellfish, and coral reefs: function like submerged break-waters to buffer coastal areas from waves and reduce erosion, while oyster and shellfish reefs improve water quality.

Set-back levees: levees built well beyond the river to allow natural floodplain flooding and store water, slow stream velocity, and reduce downstream flood height.

Two-stage ditch: drainage ditches that have been modified to include floodplain benches that mimic a natural floodplain. During storm events two-stage ditches allow the water to spread out onto the floodplain, slowing it down and leading to greater channel stability

Vegetated dunes: vegetated mounds or ridges adjacent to beaches or on barrier islands that trap and stabilize sand and absorb storm surge and waves.

Wetlands: act as sponges by slowing and absorbing water to reduce flood heights and storm surge velocity and height.

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