

# Constructed wetland restoration: benefit for stormwater management and urban waterway protection

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Constructed wetlands (CWs) are important Water Sensitive Urban Design (WSUD) element for the management of urban stormwater nutrient and protection downstream waterways from such nutrients. CWs attenuate nutrients effectively in the first few years after the construction. However, effectiveness can decrease with time due to periodic accumulation of nutrients and organic matter in the sediments, degradation of the riparian zones, input of polluted groundwater, alteration of water flow path, diffusion and resuspension of nutrients from the sediments, and senescence of plant material. In the long term CWs can be a source of nutrients, and therefore retrofitting or restoration of existing CWs is a key management intervention to maintain nutrient attenuation. However, how these restoration efforts impact on the attenuation of different nutrient species is poorly understood. There is also little clarity on how long such restoration efforts continue to improve nutrient attenuation and whether such restoration remains effective under highly variable hydrological and biogeochemical conditions. We investigated the effectiveness of restoration of the Anvil Way Compensation Basin, a 0.9 ha meandering surface flow CW on Swan Coastal Plain of Western Australia, on stormwater nutrient attenuation. The site was built in 2004 and restored in 2009. We consider whole approach, and analysed long term data set of water quality, water flow, sediment quality and macrophytes quality. We observed that restoration effort significantly increased nutrient attenuation capacity of the CW. The site decreased nutrient loading to the downstream waterways overtime due to restoration. Furthermore, the site offered habitat for waterfowl and plant species that subsequently increased urban livability.

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