

## Regenerative Stormwater Conveyances What Defines Success?

Stormwater Retention Areas (STAs) are innovative and alternative measures used to detain and control stormwater runoff. STAs mimic wetlands by combining benefits from these natural systems and incorporating them into a stormwater control measure (SCM) that provides structural stability, microhabitat, in addition to potentially providing groundwater recharge and nutrient removal benefits.

**Problem:** To determine if there are measurable and standard definitions of success for STAs and whether potential ecosystem service benefits can be provided.

Field investigations were conducted on two constructed STAs Mirror Lake and Longshore Lake with the primary focus of evaluating whether the SCMs successfully manage stormwater runoff in an effort to secondarily confer potential nutrient and sediment removal capabilities by examining biological indicators.

Utilizing the equation and removal adjustor curves used by the City of Naples we identified the analytes to check. Based on the research and field investigations, it was determined that STAs are structurally stable systems effective at detaining and conveying stormwater runoff and the examined STAs are functioning successfully, thereby, achieving the primary function of managing stormwater runoff within a specific Catchment area.

However, there are research gaps in the lack of nutrient removal design standards for STA systems. There is evidence that biogeochemical reactions occur within STAs systems similar to that of wetland indicate that STAs have nutrient and sediment removal capabilities. However, research data on water quality monitoring is lacking for STAs that reduces the reliability of calculating nutrient and sediment removal rates given the site specific nature of each STA.

We introduced a Floating Treatment Wetland and stocked it with recommended aquatic plants and all plants died from nutrient starvation. We introduced Vetiver grass and within six months stabilized water quality. We doubled the number of plants and have determined that 60 plants is sufficient to control a 4.2 acre STA.