INVESTIGATION OF NUTRIENT REMOVAL IN WATER RESOURCES THROUGH FLOATING TREATMENT WETLANDS AND AQUATIC PLANTS

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EXPERTISE THESIS ABSTRACT

Increasing population growth rate has increased the demand for fresh waters. The accumulation of nutrients (i.e. nitrogen and phosphorus) in water resources coming from point and diffuse sources results in negative effects on aquatic ecosystems. This leads to eutrophication problem in water. Eutrophication not only changes water quality parameters but also influences bottom creatures, disrupts biodiversity and causes the area to become nutrient sensitive.

The limited availability of fresh water resources makes it necessary to protect and improve the water quality in eutrophic or disposed to become eutrophic areas. In the scope of conservation methods, measure are applied to prevent the excess amount of nutrients from reaching to the receiving environment through discharge standards. While conservation measures are widely carried out in the world, they might be insufficient in some cases and mitigation/improvement applications are required. For this reason, various improvement methods have been developed to reduce pollution in the water source directly. It is necessary to decide which of the treatment methods or combination of methods to be applied is the most appropriate and cost effective. In this context, floating treatment wetlands come to the forefront as a new technology being relatively cheap, effective, sustainable and eco-friendly designs to reduce water pollution especially from diffuse sources.

This thesis study was conducted in order to contribute to the literature on floating treatment wetlands as there were very few studies in our country. In this context, current studies regarding two of the water quality improvement methods, floating treatment wetlands and aquatic plants, their nutrient removal processes, design factors, advantages and disadvantages were evaluated. Having low energy consumption and low cost, floating treatment wetlands were found to be efficient with average removal efficiencies of approximately 56% and 55% for total nitrogen and total phosphorus, respectively. In Gediz River Basin, Sazlı Lake with an exceeding assimilation capacity of 83% was chosen as an application example in which the calculated area for the floating

treatment wetland was 1,23% of the Lake surface area in order to lower its assimilation capacity to the required level. This result showed that floating treatment wetland systems are more advantageous than other methods by requiring less space as well as being cheaper. Within this framework, this study is thought to be guideline for the application of floating treatment wetlands.

Keywords: Eutrophication, Floating Treatment Wetland, Floating Island, Aquatic Plants, Nutrient Removal, Phytoremediation