

ORAL SESSION: Ecological restoration: aquatic vegetation and ecosystems

NAME(S): Roelf Pot¹, Gerard N.J. ter Heerdt²

INSTITUTION(S): ¹Roelf Pot Research and Consultancy, Oosterhesselen; ²Waternet, Amsterdam; The Netherlands

TITLE: Rapid developments and spatial variation in submerged lake vegetation after restoration measures

ABSTRACT: Development of submerged vegetation was monitored in the 2.3 km² shallow Lake Loenderveen after fish stock removal in winter 2004/2005. This measure was the final phase in a restoration program to reduce eutrophication that kept the lake in a turbid, phytoplankton dominated state without any submerged macrophytes for over 20 years.

Every year since then new developments were recorded, starting with return of 13 species in the first year, very high biomass production in the second year, complete shift from one dominant species to another and vice versa. Complete cover of the lake was achieved in the fifth year by *Elodea nuttallii* but the sixth year the plants premature lost soil contact, resulting in a massive piling up of plants at the banks and loss of submerged vegetation dominated by *Potamogeton sp.* in these parts. Nevertheless, one year later the system was stable again and started recovering from its losses. Seemingly independent development with several *Chara sp.* was recorded in large parts of the lake.

Nutrients, chlorophyll content and several other parameters were measured two-weekly during the period, in- and outflux of water by seepage and by management were estimated, and soil fertility was examined. Fish stock development and waterfowl density were regularly estimated.

The shift from turbid state into clear state could be expected based on the nutrient content of the water. The rapid, irregular development was reason for speculation on the state of the system. The mass decay in the sixth year was reason for complaints of residents.

It was concluded that trophic state of the lake water was sufficient for returning to the clear water state, but higher soil trophic state was responsible for the fast developments in most of the lake. Waterfowl grazing was concluded to be a key factor in adjusting the effects and absence of grazing due to ice cover was the cause of the one year excessive growth. The parts with *Chara sp.* dominating differ in soil type, depth and most probably in seepage flux and quality. Stability of the system in terms of macrophyte species composition and density is not expected before nutrient content of the water and the soil correspond with each other.