FINDINGS: POSITIVE AND NEGATIVE IMPACTS ON WATER QUALITY

The study showed as hypothesized that reducing light input in the water reduces significantly algal growth, with significantly lower algal concentrations in the black aquarium than in the illuminated aquarium (Figure 2). This resulted in lower dissolved organic carbon (DOC) concentrations mainly caused by a lower biopolymer production by algae in the dark aquarium. Reducing biopolymers in water could be beneficial for the water treatment process, as biopolymers are responsible for treatment challenges such as membrane fouling. However, the lower light input also resulted in higher inorganic matter concentrations such as phosphate, nitrate, bicarbonate or silicate, as a result of lower consumption by algae. The removal of such nutrients by the water treatment is essential as inorganic nutrients may contribute to bacterial regrowth in the drinking water distribution system and lead to biological instability. The study showed therefore that reduced light input caused by floating solar panels may have concomitant positive and negative impact on raw water quality used for drinking water production.

CONCLUSION: NEED FOR FULL-SCALE WATER QUALITY MONITORING UPON INSTALLATION

At this stage however, it is too early to conclude whether the measured effects in the controlled aquarium test will be significant at full-scale under real conditions. The impact of reduced light input by floating solar panels at PWN's treatment facility may be limited by the design of the panels, organised in small islands equally distributed over the surface, therefore avoiding a large area being fully covered (Figure 3). However, the mechanisms involved are the result of a complex ecological system in the water reservoir, where algae consume nutrients and are in turn part of a larger food chain, which are difficult to predict. Comparison of relative concentrations of different algal groups in the raw water, full-scale reservoir, illuminated and dark aquaria showed that the environmental conditions strongly influence the ecology of water. Algal species and concentrations also strongly vary along the year, as illustrated in Figure 1. Other impacts of solar panels such as wind mixing and localised growth also need to be considered. PWN will be carefully monitoring water quality before and after installation of the solar panels to detect any deviation in water quality. The study is a prelude to larger-scale implementation of solar panels to reduce treatment plant energy consumption costs without adverse impact on surface water quality for drinking water production. **WWA**

Figure 3: Floating solar panel in the form of an island