Interview on World Water Day on 22 March 2020

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Topics: Drinking Water | Biodiversity | Ecosystems

The theme to this year's UNESCO World Water Day is "Water and Climate Change". Environmental scientist Martin Schmid, who is Head of the Eawag Group Applied System Analysis in the Surface Waters Department, talks about how climate change is impacting on waterbodies in Switzerland.

Martin, Switzerland is now known as the "water tower of Europe". Will Switzerland still have an excess of water in the future?

Overall, Switzerland will still have enough water in the future. But some regions may experience more frequent water shortages in the future, especially in late summer or autumn. This is because, on the one hand, the runoff at this time of year will not be as high as before and, on the other hand, our consumption of water is increasing, as we need more for irrigating farmland for example.

How does climate change affect the lakes in Switzerland?

Summer surface temperatures of lakes increase at similar rates as air temperatures. They have risen by 1 to 2°C over the last 30 years. Ice-cover duration on our lakes will be shorter, and some lakes will completely stop freezing over in winter. Changes in seasonal mixing can play an important role. Most lakes in Switzerland turn over fully once or twice every winter. In some lakes, this turnover will be complete only every few winters. This has already been observed in some Swiss lakes, such as Lake Zurich.

How will climate change affect lake water quality?

The higher surface temperatures can promote the growth of cyanobacteria, more commonly known as

blue algae. Some of these cyanobacteria release toxins and pollute the water if they are present in large quantities. The “Swimmer’s itch” will become more frequent. It is caused by the larvae of parasitic flatworms which thrive in warm water. And the incomplete seasonal turnover mentioned above may cause oxygen depletion in the deep waters of lakes.

How do these altered conditions affect living organisms in the water?

Water temperature, stratification and mixing processes play the same role for organisms living in lakes as the weather and seasons do for those on dry land. Some species will thrive as a result of changes in these processes, but others will suffer. In particular, if the deep water of a lake becomes seasonally oxygen-depleted, it is inhabitable for higher lifeforms, such as fish and insect larvae.

The terrain in Switzerland is mountainous. Are our mountain lakes particularly under threat because of climate change?

The lakes that are most likely to suffer the greatest impact are those in which something fundamentally changes over the course of the year. This would include, for example, lakes at medium altitudes where the winter ice cover disappears, or deep lakes at low altitudes that no longer turn over fully in the winter. However, we do not have sufficient observations from Swiss mountain lakes to thoroughly assess their sensitivity to climate change.

As you have already mentioned, there is an increase in water consumption during longer dry periods in the summer. Are we drying out our waterbodies?

Streams and rivers suffer most from dry periods. Any withdrawal of water exceeding that of normal public use must be approved by the cantonal or municipal authorities. The Water Protection Act stipulates how much water must remain in a watercourse after water has been withdrawn. This may lead to water shortages for farming enterprises. Farmers in regions that are likely to suffer more frequent water shortages in the future might consider cultivating crops that require less water.

Today around 20 percent of all drinking water in Switzerland comes from its lakes. Is this drinking water at risk because of climate change?

In principle, this drinking water is not at risk. But at some water intakes water quality problems could occur more frequently, if, for example, the water at the depth of an intake is oxygen-depleted or in case of large algae blooms.

Are there ways to mitigate the effects of climate change on our waterbodies?

For some rivers and streams, shading by additional trees along their shores could provide a cooling effect in the summer. It is important to maintain or recreate the connectivity along river networks with as few artificial barriers as possible and to protect cooler areas that offer a place of refuge for animals, such as fish. The effects of climate change on lakes are, in part, similar to those caused by an excess of nutrients. The successful measures taken so far to reduce the loads of nutrients into lakes should therefore be continued. And finally, we should all do our bit to help ensure the climate does not warm up too much.

Further Information

World Water Day

An overview of the impacts of climate change on waterbodies and water resources in Switzerland will be given at the final symposium of the Hydro CH2018 project on 17 November 2020:

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