Future Resilience

5. Climate Change

The full effects of climate change in the UK remain uncertain, however the frequency and magnitude of extreme weather is suggested to increase. This threatens the security of our natural environment and therefore supporting nature to create sustainable and resilient ecosystems is important.

Precipitation is vital to the ecological and social value of King's Pond. The upstream River Wey feeds into King's Pond and is dependent upon precipitation. However, climate change has led to UK winters and autumns being significantly wetter, with previous research suggesting 7 % increase in rainfall per 1°c of warming in the UK. Therefore, the River input to King's Pond may increase seasonally, resulting in more erosion and siltation of the pond.

As the climate warms, evaporation increases and the air holds more moisture. This means UK springs are increasingly humid, while the land and waterbodies such as King's Pond, have a greater potential evaporation. Evaporation is a major risk to King's Pond primarily from drying out, but drying out will subsequently cause the ecosystem of King's Pond to decline, and over time recovery will be increasingly difficult.

Decreasing water volume causes the specific heat capacity to change, and so temperature of the pond may become less stable. An increase in water temperature would cause an increase fish and other organism mortality in the pond, which can trigger further cycles of ecological decline. A declining ecosystem within a pond such as King's Pond, can cause a forward switch in ecosystem structure. This means the pond becomes stable in being dominated by algae and microbes, indicative of poor water quality and reduced biodiversity, this also tends to reduce the amenity value of pond features. This stability is then often expensive and difficult to reverse. Therefore, it is vital to prevent the initial change from occurring by developing a resilient pond ecosystem at King's Pond which can resist this process.

UK summer precipitation trends are also anticipated to change with longer periods of drought followed by flashy and intense rainfall events occurring. In suburban and urban settings such as Alton, the impermeable nature of road and paved surfaces combined with drought conditions, causes organic pollutants and inorganic pollutants to accumulate. Eventually the drought ends and a sudden and intense period of rainfall causes these deposits to re-mobilise and flow into the surrounding watercourses and waterbodies – here King's pond. These pollutants have a variety of negative effects on waterbodies. As summer droughts in the UK are anticipated to extend and summer rainfall expected to become more intense, it is likely that this process is an increasingly pressing issue for King's Pond in relation to the existing ecology.

Based on the above information on how a changing climate may impact the pond, it is vital that the chosen design for King's Pond mimics and works with natural processes to improve the overall resilience of the pond to reduce its susceptibility to climate change. It is felt that through bank erosion protection, reduction of invasive species, silt trapping and removal, and native planting that this can be achieved.