

## BiOWiSH® Aqua

### Chemical-Free Water Quality Maintenance The Summer Palace (颐和园), Beijing – China



#### Executive Summary

BiOWiSH® Aqua was implemented for water maintenance in the water gardens of Beijing’s Summer Palace in May 2017. Now, six months into the bioaugmentation program, water quality is maintained with reduced labor and lower dosing costs, without the use of chemicals.

#### Background

Upon its designation by UNESCO as a World Heritage Site in 1988, the Summer Palace (颐和园 Yí hé yuán) was declared “a masterpiece of Chinese landscape garden design. The natural landscape of hills and open water is combined with artificial features such as pavilions, halls, palaces, temples and bridges to form a harmonious ensemble of outstanding aesthetic value.” The Summer Palace covers an area of 2.9 km<sup>2</sup> (three quarters of which are water) in northwest Beijing and is visited by over 15 million tourists a year.

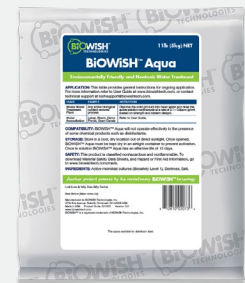
An ornamental pond in front of the Buddha incense court became the initial trial site for BiOWiSH® Aqua as a biological maintenance solution in May 2017.

The first case study published on the Summer Palace trials detailed the initial remediation process that brought the Palace into compliance with regulatory standards and reduced labor associated with manually cleaning the ponds. It is available online at [int.biowishtechnologies.com/resources](http://int.biowishtechnologies.com/resources).

#### Objectives

The objective of this extended trial was to determine the long-term benefits of bioaugmentation with BiOWiSH® Aqua. Additionally, the goal was to maintain the pond’s water quality in compliance with Beijing’s regulatory Standard IV while significantly reducing labor costs and bio-accumulative chemicals.

#### BiOWiSH® Aqua



- Rapid nitrification and denitrification in aerobic and anaerobic conditions
- Reduces sludge production
- Increases plant treatment capacity
- Reduces odors
- Reduces aeration requirements
- Reduces need for chemical additives
- Improves plant stability
- Pre-treats influent in collection systems
- Natural and non-toxic

#### Available Sizes

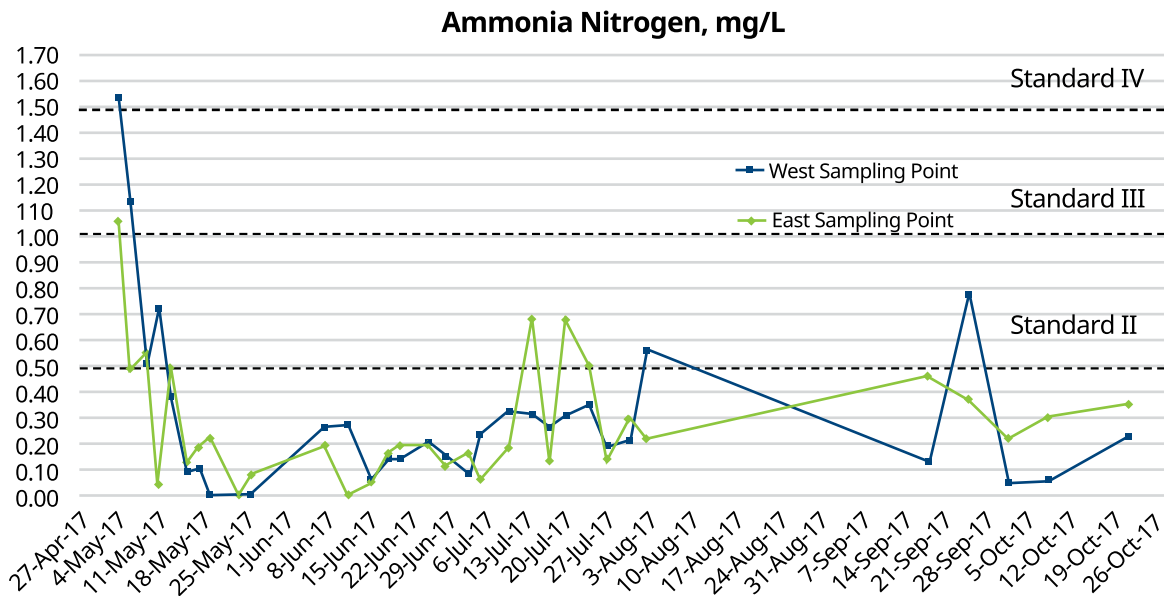
- 100g/3.5oz
- 1kg/2.2lbs
- 5kg/11lbs
- 10kg/22lbs

## Solutions

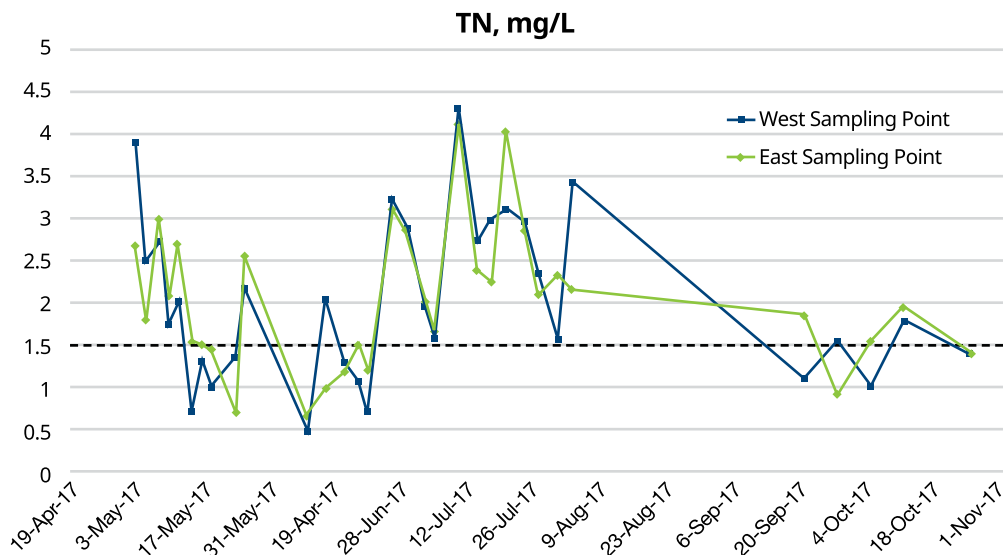
Within two weeks of treatment, the water quality in the pond met regulatory Standard IV, as detailed in the initial case study. Since that time, Palace Officials have been using a maintenance dose as described in the table below.

Dosing Phase	BiOWISH® Aqua	Frequency	Objective	Notes
<b>Phase 1</b> Biological shift	3kg	Three times per week	Target dose of 3 ppm to favor the growth of BiOWISH® organisms. This helps shift the biology in the pond to reach the tipping point for remediation.	Solid product was dissolved into 30L of fresh water and uniformly sprayed over the surface of the lake using a backpack sprayer.
<b>Phase 2</b> Remediation	1kg	Weekly	Maintain 1.0 ppm dose until the TN and TP levels are compliant with Std. IV.	
<b>Phase 3</b> Maintenance	0.5kg	Weekly	Reduce the cost to an optimization phase (0.5 ppm) while maintaining compliance with Std. IV.	

## Results

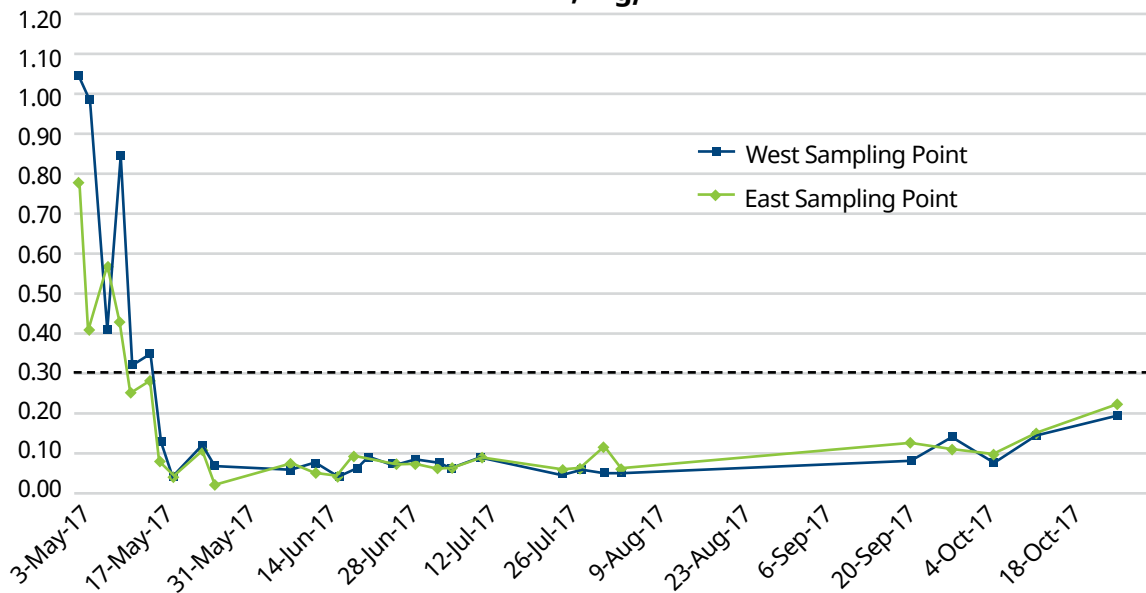


Ammonia Nitrogen levels maintained compliance with Standard II (less than 0.50 ppm).



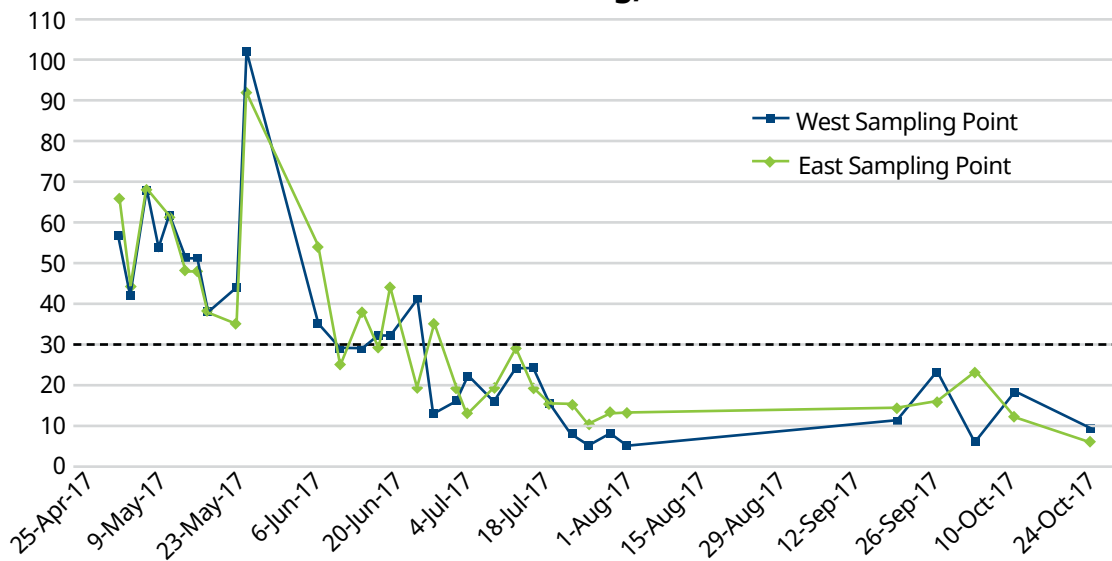
Total Nitrogen stabilized in compliance with Standard IV (less than 1.5 ppm).

### TP, mg/L



Total Phosphorus stayed compliant with Standard IV (less than 0.3 ppm).

### COD, mg/L



Organic loading (COD) maintained compliance with Standard IV (less than 30 ppm) and exhibited much more stable behavior.

### Conclusion

Bioaugmentation with BiOWiSH® Aqua continues to provide a cost-effective, chemical-free maintenance alternative for the ornamental ponds of the Summer Palace. Months after the program was started, dosing costs have been reduced, while water quality has been maintained or improved in compliance with local regulations.

BiOWiSH Technologies is grateful to the partner and customer for this great opportunity.



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