

東江水水質和水務署的水質監控

Quality of Dongjiang (DJ) Water and Water Quality Monitoring by the Water Supplies Department

發展事務委員會
Panel on Development Meeting

2013年3月26日
26 March 2013



東江水水質 - 東江流域基本情況

DJ Water Quality – Basic Situation of DJ River Basin

- 珠江流域的三大水系之一
One of the three major river systems in Pearl River Basin
- 流域總面積 = 35,340平方公里
Total area of River Basin = 35 340 km²
- 流域總面積的90%在廣東省境內
90% of total area of River Basin is within GD Province
- 香港本地集水區總面積僅為東江流域總面積的0.85%
Area of HK's local water gathering ground is only 0.85% of that of DJ River Basin



三大水庫

Three large reservoirs

- 三座大型水庫:新豐江水庫、楓樹壩水庫和白盆珠水庫

Three large reservoirs : Xinfengjiang, Fengshuba and Baipenzhu Reservoirs

- 總庫容量: 170.6 億立方米

Total capacity: 17 060 mcm

- 容量約為船灣淡水湖(2.3億立方米)的74倍

Total capacity is 74 times of that of Plover Cover Reservoir (230 mcm)



東江取水供給香港的協議

The Water Supply Agreement

- 2012-2014:供水量上限為8.2億立方米
Ceiling of annual supply quantity is 820 mcm between 2012-2014
- 約為東江平均徑流量的2.5%
About 2.5% of mean annual flow of DJ
- 最終年供水量為11億立方米
Ultimate annual supply quantity is 1100 mcm



東深供水系統

Dongshen Water Supply System

- 由源頭經過約490公里才到達太園泵站
Travels about 490km from sources to Taiyuan Pumping Station
- 透過專用輸水管道直接送往深圳水庫，再經水管到達香港的木湖抽水站
Through dedicated aqueduct to Shenzhen Reservoir and then conveyed through pipelines to Muk Wu Pumping Station of Hong Kong



《供水協議》 The Supply Agreement

- 國家《地表水環境質量標準》(GB3838-2002)第II類水標準

National standard set out for Type II waters in the "Environmental Quality Standards for Surface Water GB3838-2002".

- 最高標準

Highest standard

- 實施一系列東江水污染防控措施，確保供港東江水水質符合供水協議的要求

Implement a series of measures on prevention of DJ water pollution to ensure quality of DJ water supplied to Hong Kong complies with the Supply Agreement



東江流域保護辦法

Protection Law and Regulation for DJ River Basin

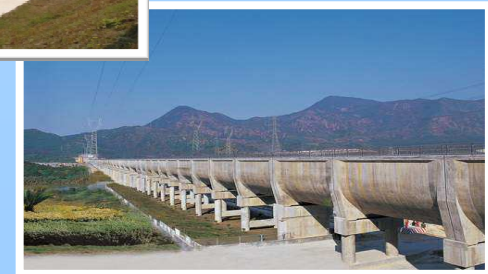
- 《廣東省東江流域新豐江楓樹壩白盆珠水庫庫區水資源保護辦法》
 - 加強保護庫區和相關庫區保護範圍的水質
Enhance protection of water quality of reservoir areas and respective reservoir protection zones
- 《廣東省東江水系水質保護條例》
 - 加強保護東江流域水質、防治污染及保障供水
Enhance protection of water quality in DJ River Basin, preventing and controlling water pollution, and safeguarding water supply
- 《國務院關於實行最嚴格水資源管理制度的意見》
 - 三條紅線管理 - 「加強水功能區限制納污紅線管理」
Three red lines management - Red line management to enhance control on pollution in water function area



加強東江水水質保護的工作

Works to Enhance Protection of DJ Water Quality

- 將輸港東江水的取水口移至較佳的地點
Relocation of intake point of DJ water supply to Hong Kong for better water quality
- 啟用專用輸水管道
Commissioning of dedicated aqueduct
- 各項調污和截排工程
Various sewage diversion and interception works
- 啟用在深圳水庫內的生物硝化站
Commissioning of bio-nitrification plant at Shenzhen Reservoir
- 在深圳水庫設立閉路電視監察系統
Set up of a CCTV surveillance system at Shenzhen Reservoir



加強東江水水質保護的工作

Works to Enhance Protection of DJ Water Quality

- 進行「東江流域水量水質監控系統」建設工程

Undertaking construction of “DJ Water Quantity and Quality Monitoring and Control System”

- 水質遙感監測技術項目- 遙感調查東江流域河流和大中型水庫的主要水污染物

Remote Sensing of Water Quality Monitoring Project - Remote sensing survey on the major water pollutants in DJ River Basin and the large to medium-sized reservoirs



監控系統示意圖
Schematic Diagram of Monitoring and Control System



水務署的水質監控工作

Water Quality Monitoring by the Water Supplies Department

- 實施《水安全計劃》，並按國際標準監測水質
Implemented a Water Safety Plan to monitor the water quality against international standards
- 粵港雙方定立體制機制，定期舉行會議討論與東江水有關的事項

Designated institutional mechanism set up for the GD and HK sides to meet regularly to discuss DJ water issues

- 粵港雙方設有通報機制，應對任何影響東江水水質的重大污染事故

Notification mechanism established between the GD and HK sides to cater for any major contamination incident affecting the quality of DJ water



東江水水質監測

Water Quality Monitoring of DJ Water



定期抽取東江水樣本監測水質
Regularly taking DJ water samples
for water
quality monitoring



木湖抽水站

Muk Wu Pumping Station



Parameter	Unit	Value
Flow (m³/s)	m³/s	0.00
Temperature (°C)	°C	15.20
pH	pH	7.80
Dissolved Oxygen (mg/L)	mg/L	6.50
DO Saturation (%)	%	100.00
DO Response	ms	1000
DO Offset	mg/L	0.00
DO Scale	mg/L	10.00
DO Zero	mg/L	0.00
DO Gain	mg/L	100.00
DO Offset	mg/L	0.00
DO Scale	mg/L	10.00
DO Zero	mg/L	0.00
DO Gain	mg/L	100.00

通過在綫水質監測系統24小時密切監測東江水水質

Monitor closely the quality of DJ water 24-hours round the clock through on-line water quality monitoring systems



東江水水質監測 Water Quality Monitoring of DJ Water



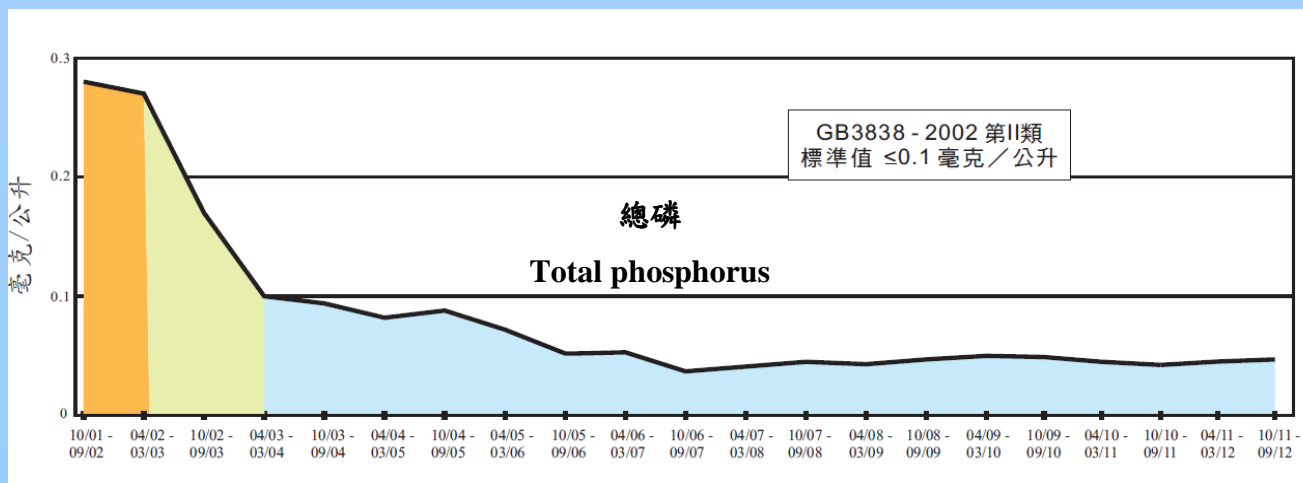
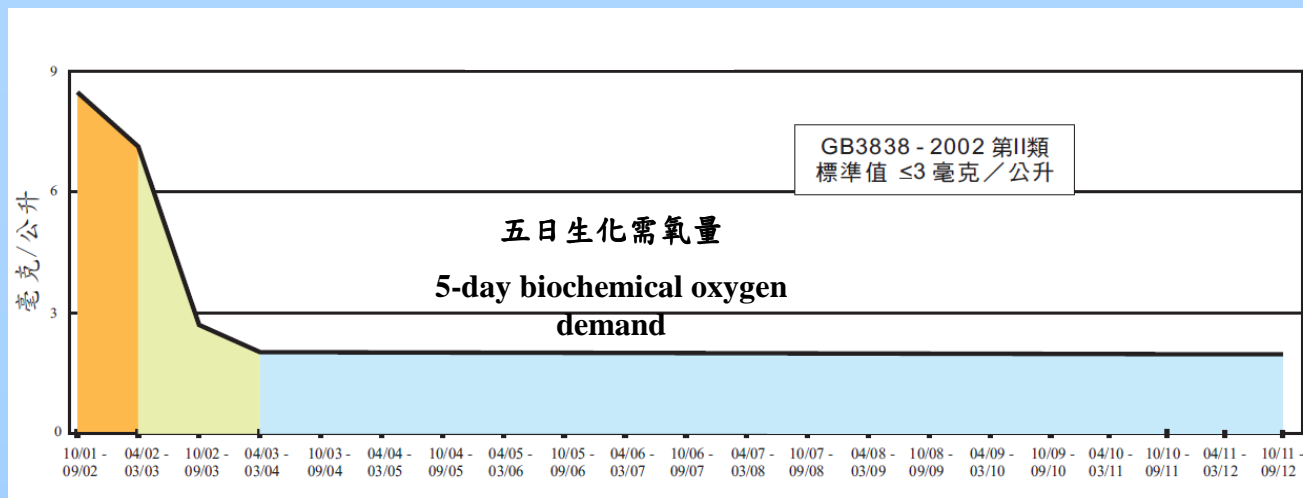
進行詳細的物理、
化學、細菌學、輻射學
等分析

Conducting detailed physical,
chemical, bacteriological and
radiological analyses, etc.



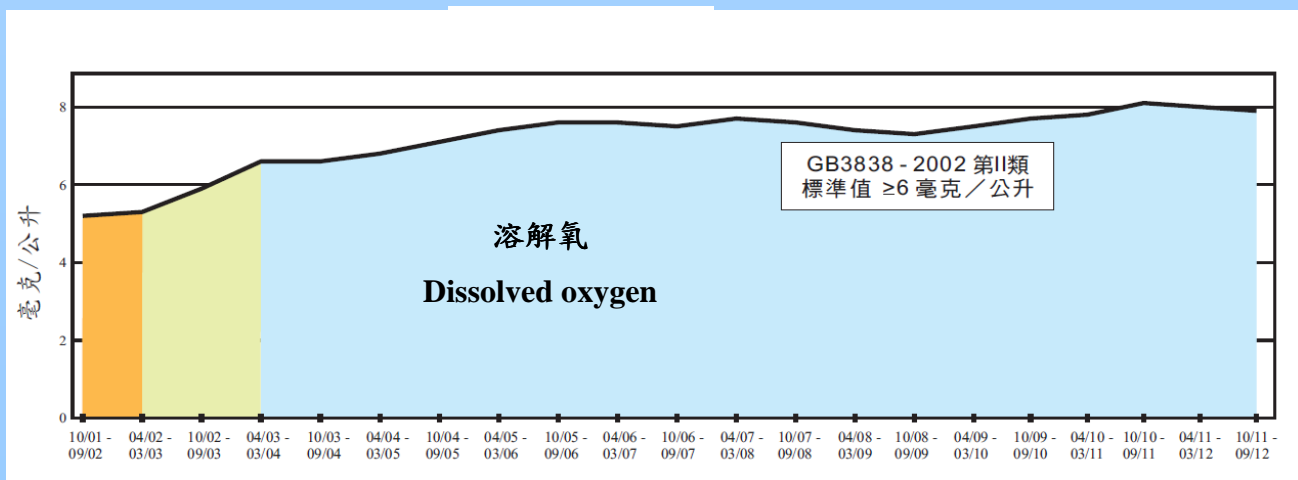
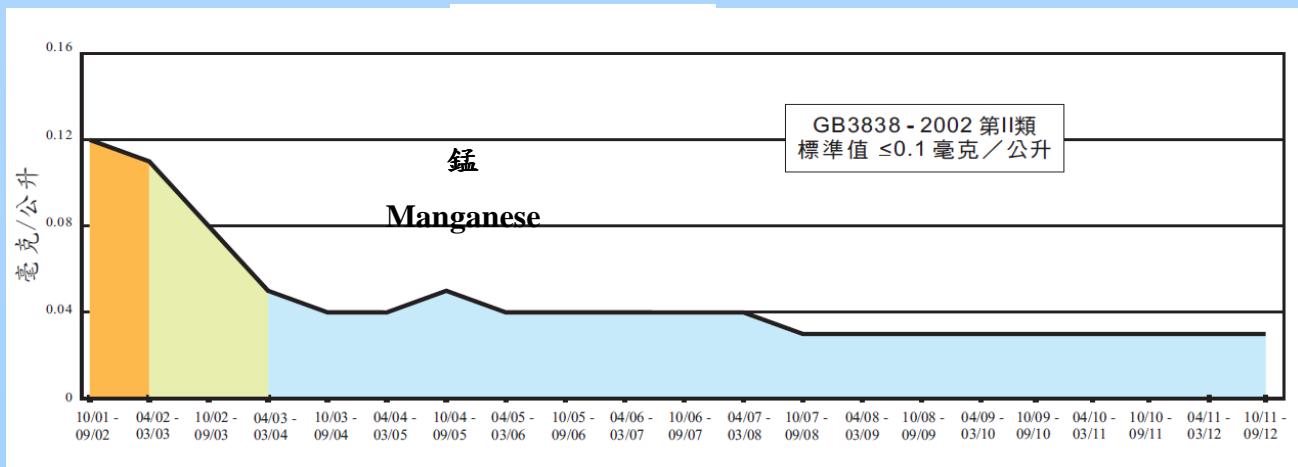
東江水水質監測

Water Quality Monitoring of DJ Water



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東江水水質監測

Water Quality Monitoring of DJ Water

- 如發覺水質有任何異常情況，水務署會
On detection of any abnormality in the DJ water quality, WSD will:
 - 加強相關的水質監測
Step up the water quality monitoring
 - 調控食水處理程序
Adjust the water treatment processes
 - 有需要時聯系粵方跟進
Liaise with the Guangdong authorities if necessary



體制機制 Institutional Mechanism

- 粵港供水工作會議

HK/GD Water Supply Business Meeting

- 討論與東江供水有關的事宜包括水源保護及水質監察

Discuss various issues relating to DJ water supply including water resources protection and water quality monitoring

- 粵港供水運行管理技術合作小組會議

HK/GD Water Supply Operation and Management Technical Cooperation Sub-group Meeting

- 檢視水質監測工作，討論、跟進和落實各項有關減少東江水污染源的措施及執行情況

Examine water quality monitoring work, discuss, follow up and take forward all measures for reducing pollution of DJ at sources and its implementation

- 東江水質保護專題小組

The Special Panel on the Protection of Dongjiang Water Quality

- 討論加強保護及改善東江水質的策略、方案及成效

Advise on DJ water quality and discuss strategies, plans and their effectiveness



通報機制

Notification Mechanism

- 當遇有影響輸港東江水水質的重大污染事故時，粵方會即時通知水務署
In the event of any contamination incident affecting the quality of DJ water supplied to Hong Kong, the Guangdong side will immediately notify the Water Supplies Department
 - 廣東省環境保護廳 - 有關東江河流或水體
Department of Environmental Protection of Guangdong Province - relating to DJ river or water body
 - 粵港供水有限公司 - 有關東深供水工程範圍
Yue Gang Water Supply Co. Ltd. - for Dongshen-Hong Kong Water Supply Scheme
- 若有需要，水務署會與有關機構配合和協調、採取確保香港的供水水質安全的控制措施：
If necessary, WSD will cooperate and coordinate with the parties concerned to take appropriate control measures to ensure the safety of water quality in Hong Kong. Major control measures include:
 - 立即提升水質監控
Immediately step up monitoring of the quality of Dongjiang water
 - 減少或暫停東江水的供應
Reduce or suspend the supply of DJ water
 - 排放所有已接收的東江水
Discharge all incoming Dongjiang water at Muk Wu Pumping Station
 - 調配本地水源
Switch to local water sources
 - 索取詳細資料以便制定下一步的相應行動
Collect more detailed information to formulate further actions required



食水水質監測

Water Quality Monitoring of Drinking Water

- 嚴格的食水處理和消毒程序，保障市民的健康
Rigorous water treatment processes and disinfection for protection of public health
- 水務署已實施世衛所訂的水安全計劃
WSD is implementing WHO's Water Safety Plan
- 預防性風險管理及多道屏障體系為本
Based on preventive risk management and multiple-barrier approach
- 全面監控從水源、食水處理過程、至分配系統的水質，確保食水水質安全
Assuring quality and safety of water from source, through water treatment processes to distribution system

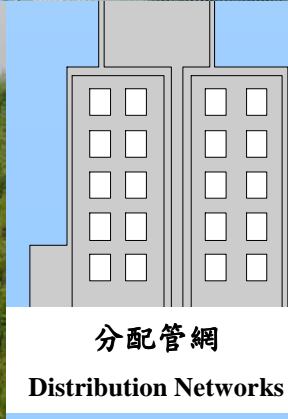


食水水質監測

Water Quality Monitoring of Drinking Water

從供水系統中不同的地點抽取水樣本進行詳細分析

Water samples are taken at various points of the entire supply system for analyses



食水水質監測

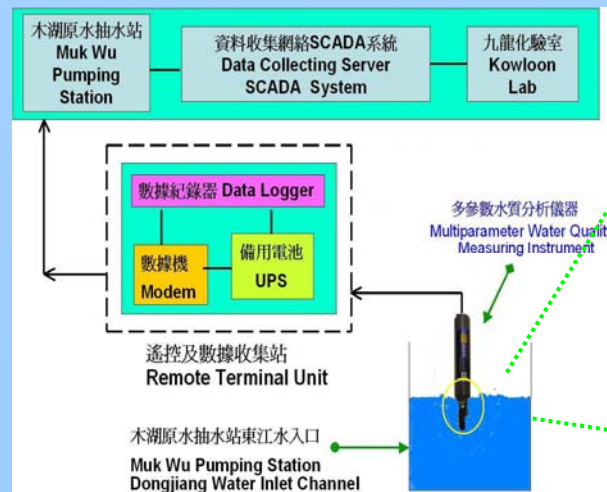
Water Quality Monitoring of Drinking Water

- 採用先進水質監測技術提昇快速的預防性監測能力，確保供水水質安全
Adoption of advanced water quality monitoring technologies to enhance the capability of rapid and preventive monitoring to safeguard water quality
- 嶄新技術包括：
State-of-the-art technologies include:

- 全自動多參數水質監測技術

Automated multi-parameters water quality monitoring technology

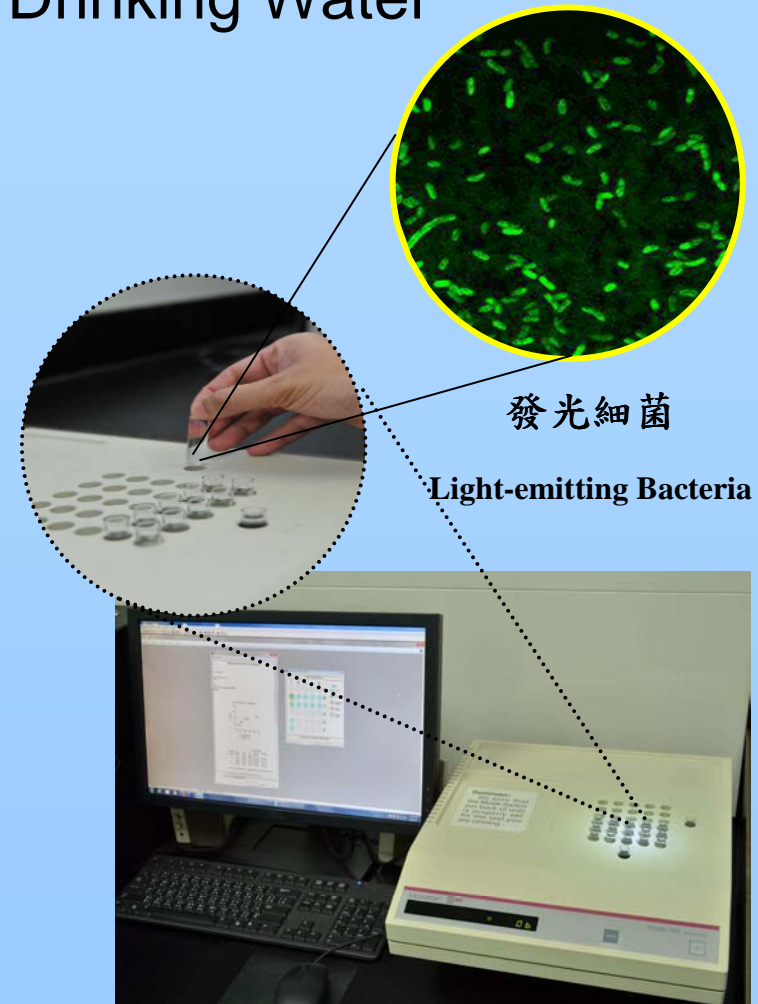
- 自動監測不同水質參數的監測儀器
Automatically measures different water quality parameters



食水水質監測

Water Quality Monitoring of Drinking Water

- 生物發光測試技術
Bioluminescent testing technology
- 發光細菌在新陳代謝時發光的特性
Bioluminescent property of bacterium emits light from metabolic activity
- 有害物質時會抑制細菌發光
Harmful substances inhibit the light emission from bacteria
- 快速測試水質毒性
Rapid toxicity testing of water quality.



發光細菌

Light-emitting Bacteria

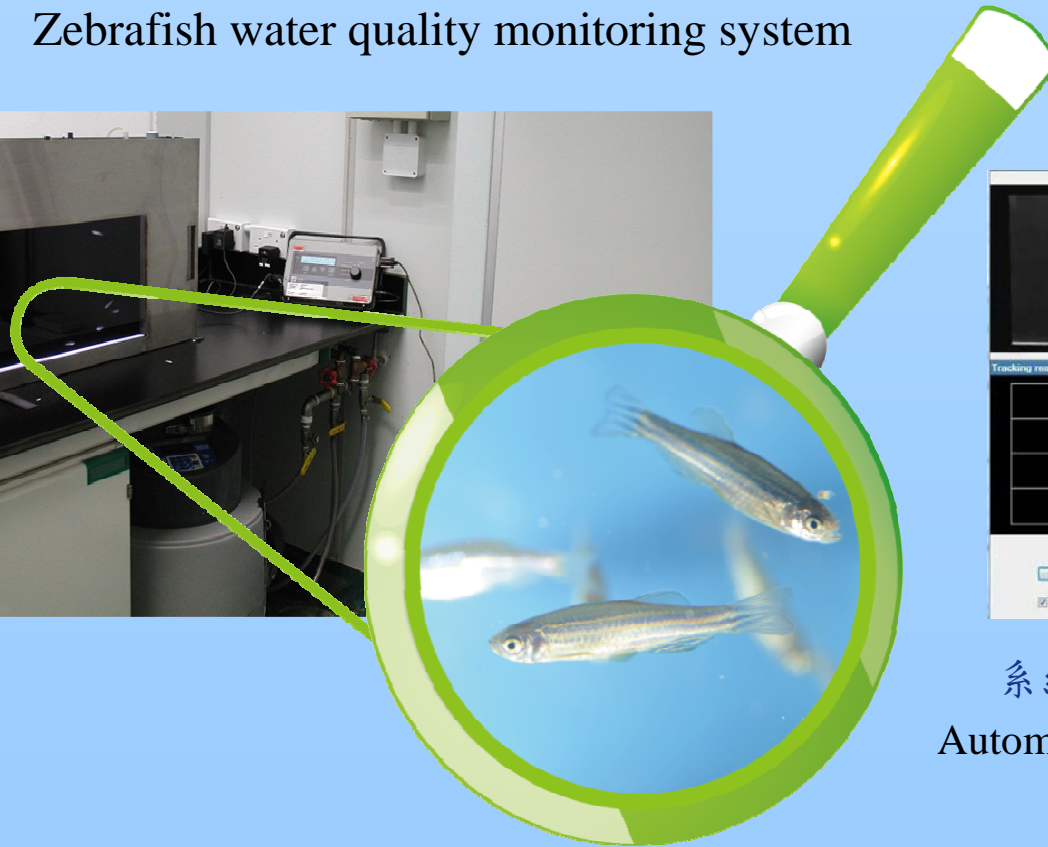
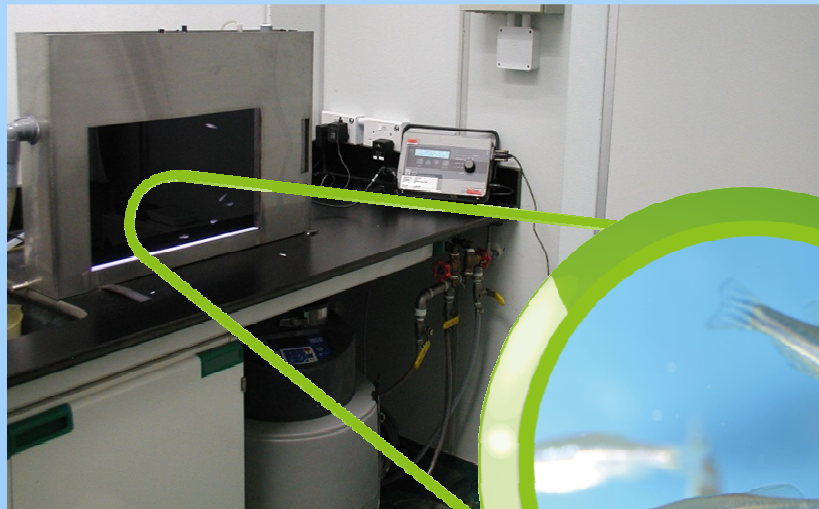
生物發光測試儀

Bioluminescent testing instrument

食水水質監測

Water Quality Monitoring of Drinking Water

- 斑馬魚水質監察系統
Zebrafish water quality monitoring system



System settings	
Parameter	Value
Conspicuous threshold (%)	20
Maximum frame size (px)	5
Minimum object length (mm)	10
Minimum object length (mm)	90
Minimum object threshold (mm)	0
Maximum skip time (second)	1
Maximum speed (mm / second)	300
Maximum change in size (%)	90
Expected no. fishes / tank	5
Missing fish grace period (second)	120
Life fish region (% from top / bottom)	7
Inactive fish speed (mm / second)	3
Inactive fish grace period (second)	300
Signs of Suffocation (x4s)	D1,D2,D3,D4
Signs of Suffocation (%)	80
Suffocation grace period (second)	75
Signs of Avoidance (x4s)	D1,D4,A1
Signs of Avoidance (%)	45
Avoidance grace period (second)	75
Resistant phone nos.	96561236, 6337615...
Alert good time (minute)	1
Maximum no. of alert (per day)	10

Tracking results			
5% 0%	2% 0%	5% 0%	6% 0%
2% 0%	4% 0%	2% 0%	4% 0%
3% 0%	1% 0%	4% 0%	1% 0%
6% 0%	9% 0%	20% 0%	14% 0%

Disturbance results	
Background frame updated	Ready 500 x 200
Current frame rate	
Tracked fishes	5
Inactive fishes	
Inactive fish detected since	
Inactive fish lost detected	
Missing fish detected since	
Missing fish lost detected	
Suffocation detected since	
Suffocation lost detected	
Avoidance detected since	
Avoidance lost detected	

系統自動監察和分析斑馬魚的活動
Automatic monitor and analysis of activities
of zebrafish



總結 Conclusion

- 粵港雙方保障東江水水質共同努力
Both GD and Hong Kong sides have strived to safeguard the quality of DJ water
- 經濾水廠處理的食水亦符合世界衛生組織最新制定的《飲用水水質準則》(WHO 2011)
Treated drinking water from water treatment plants is also in full compliance with the requirements stipulated in the latest WHO's "Guidelines for Drinking-water Quality" (WHO 2011)



總結 Conclusion

- 廣東省各個地區的迅速發展和氣候變化
Rapid development in regions of GD Provinces and climate change
- 東江水水質監控與可供使用水量是需要關注的議題
Monitoring of DJ water quality and available water quantity are subject matters deserving focused attention
- 繼續與廣東省緊密合作
Continue to work closely with GD Province
- 有需要時尋求增加資源加強工作
If needed, additional resources will be sought to strengthen the works



多謝

Thank You

