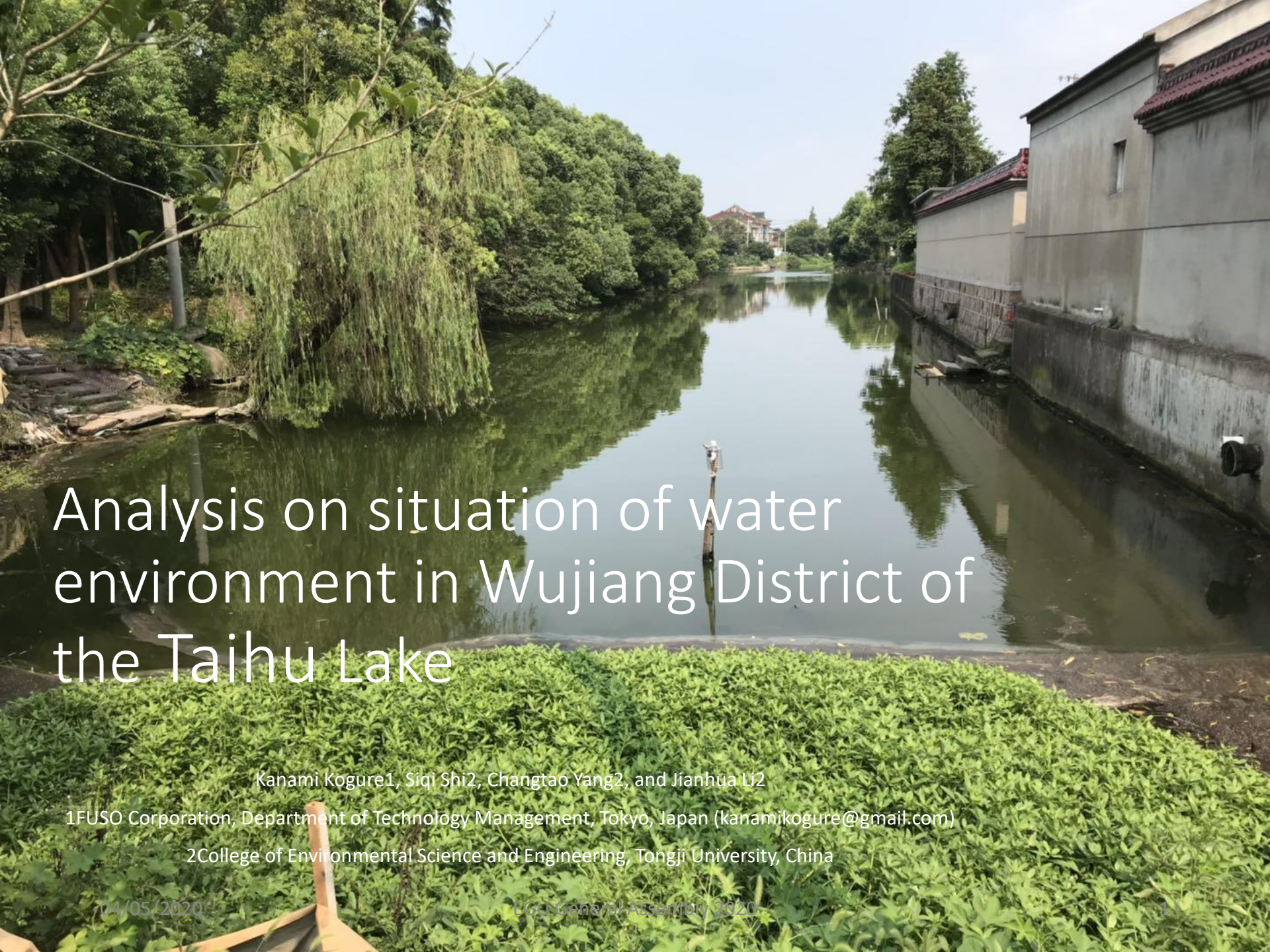




Analysis on situation of water environment in Wujiang District of the Taihu Lake

Kanami Kogure¹, Siqi Shi², Changtao Yang², and Jianhua Li²

¹FUSO Corporation, Department of Technology Management, Tokyo, Japan (kanamikogure@gmail.com)

²College of Environmental Science and Engineering, Tongji University, China

Introduction

Human activities make significant impacts on water environments and can deteriorate environmental situation of water bodies. It's remarkably important to control discharging pollutant into the environment.

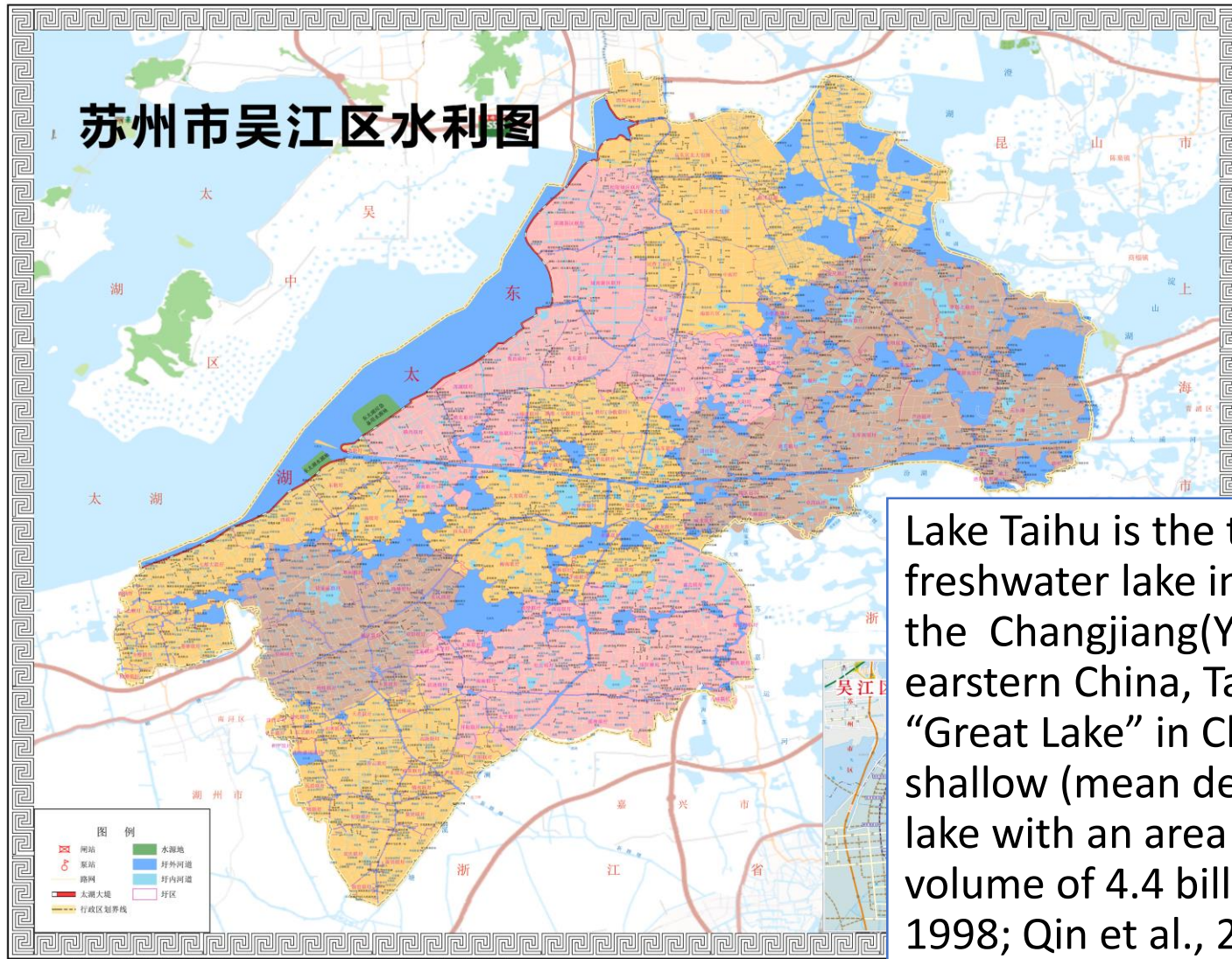
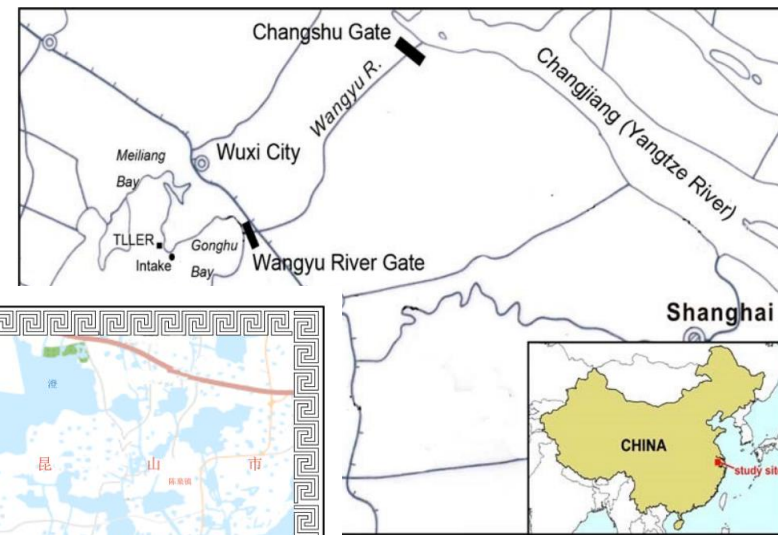
Our research team have conducted research on water environment in the Taihu Lake area in China. We carried out field investigation with sampling and measurement followed by analysis of our measurement data and obtained data from Suzhou local government in order to understand actual water quality situation and to prepare monitoring and regulation for better water environment protection.

Introduction – Wujinag District

- Wujiang District, located in the southernmost tip of Jiangsu Province and Suzhou City, lies at the junction of Jiangsu, Zhejiang and Shanghai provinces, is lower leach area of the Taihu Lake Basin. There are rich forestry resources, natural stream systems, and flood control districts in the Taihu Lake area, which play an important role in conservation of water resources and their water quality.
- Wujiang District has a population of 1.6 million, which supply agricultural production and support industrial and economic development.
- However, human activities such as industrial production and social life have a significant negative impact on the water environment of the river network in Wujiang District, and hence, large amount of pollution can be potentially released to the Taihu Lake area, and further deteriorate the environmental situation of the Taihu Lake waters and river environment.

Research area

Fig. 1 Location of Lake Taihu, Meiliang Bay, Gonghu Bay, Gonghu Water Works intake (Intake in abbreviation), Wangyu River Gate, Wangyu River Changshu Gate, Wuxi City and Taihu Laboratory for Lake Ecosystem Research (TLLER)



Lake Taihu is the third largest freshwater lake in China. Located in the Changjiang(Yangtze) delta in earstern China, Taihu (meaning “Great Lake” in Chinese) is a large shallow (mean depth ~2m) eutrophic lake with an area of 2338 km² and a volume of 4.4 billion m³ (Pu and Yan 1998; Qin et al., 2007)

Taipu River and Great Canal in the Taihu Lake Basin

River network of Wujiang District is too complicated to understand pollution situation. Water domain covers 22.7% of the total area, small lakes and marshes are connected to each other by canal system.

As the Taipu River is utilized as water resources for drinking water, water level is kept higher than connecting rivers and channels to avoid contamination from tributaries by controlling slice gates.



Slice gate at connection point

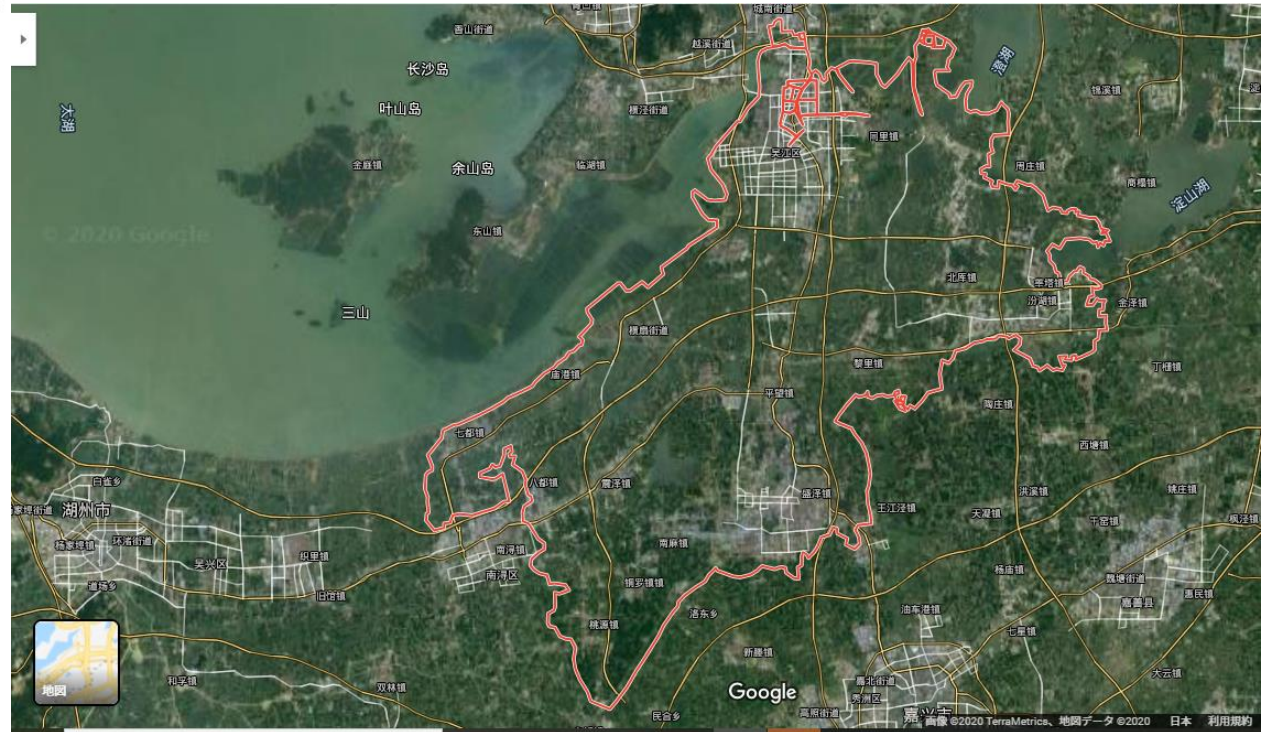
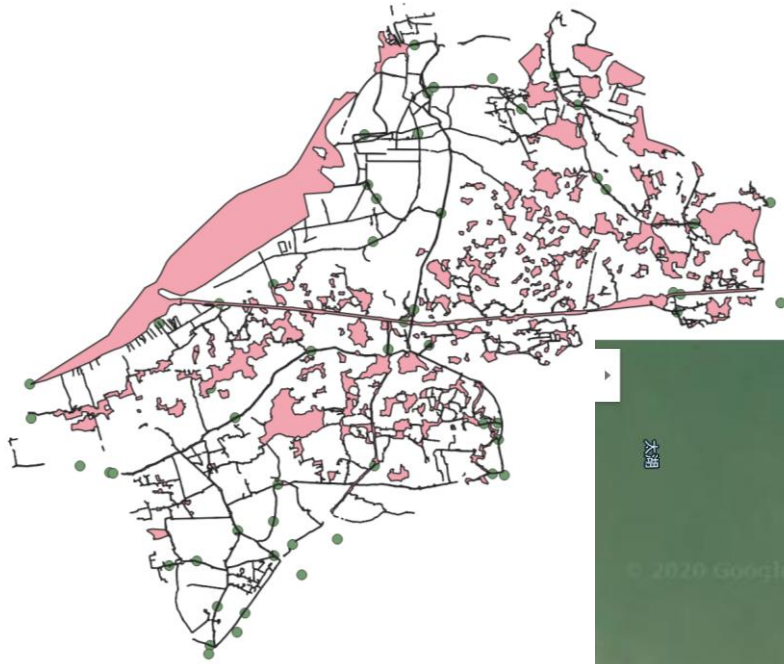


Water sampling



Water environment along the river

GIS data showing water network and monitoring points

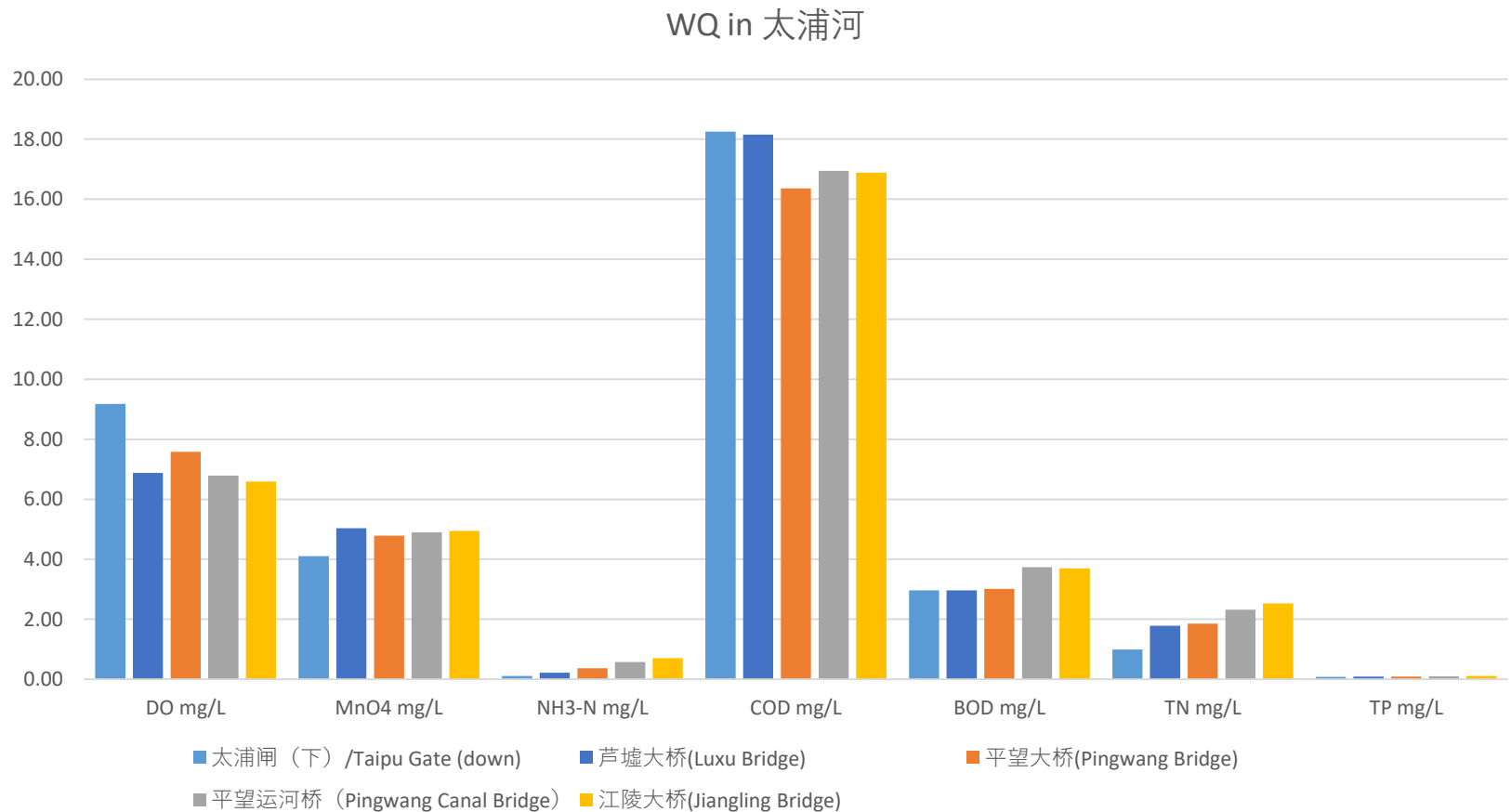


3/22/2019

Survey and Measurement

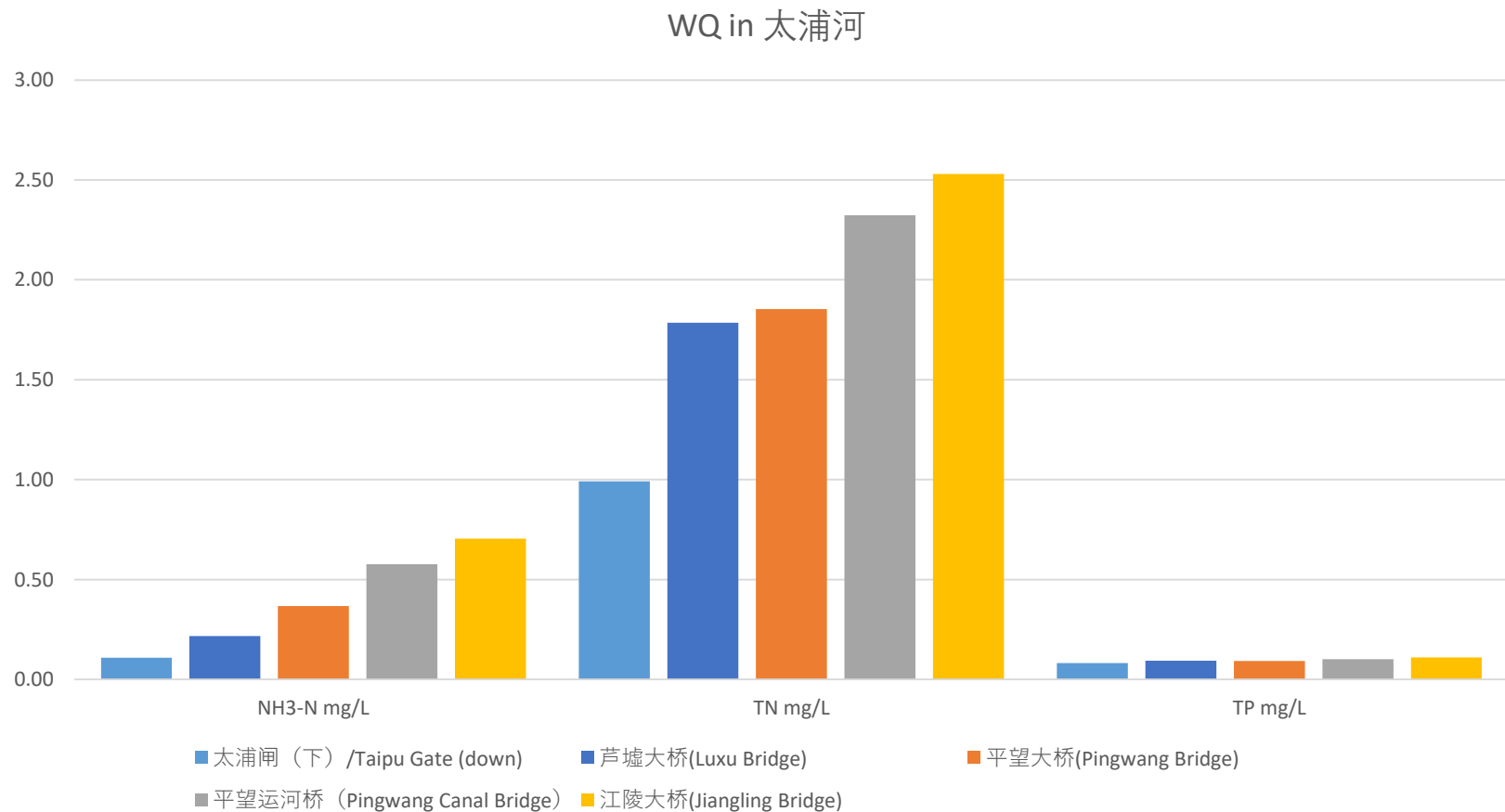
- 116 monitoring points were set at 66 river crossing points and in 50 marshes larger than 0.5 square kilometers.
- Monitoring data of water quality indicators include: pH, permanganate index, ammonia nitrogen, total nitrogen, total phosphorus, cyanide, sulfide, fluoride and some heavy metals.
- Chlorophyll a, COD, BOD, flow rate, water level, features of monitoring sites have also been investigated. Water quality have been monitored continuously by local government and measured once or twice per month by research team.
- Monitored water quality data since 2015 was presented by government, and sampling data since 2017 were measured for each parameter.
- Based on data analysis, pollution situation and mechanism have been discussed.

Water quality in Taipu River



Jiangling is located in the Great Canal

Taipu River with focus on N and P



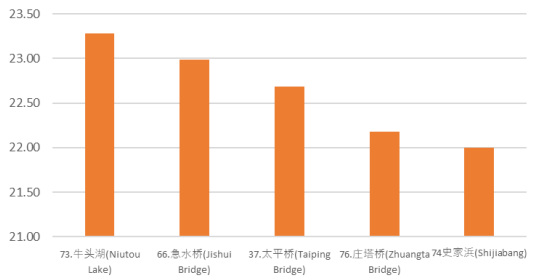
Water quality situation

- Higher nutrient concentration in lower reach even in Taipuhe river and canal which water level are kept to be higher than other water bodies.
- → It is sure that there're pollution sources in the catchment.
- It is necessary to monitor water quality along main river in addition to continuing analysis on the area
- Based on monitoring, there're areas with higher pollution (shown in next slide).
- It is suggested that pollution sources discharging into river network in Wujinag area near points in the list.

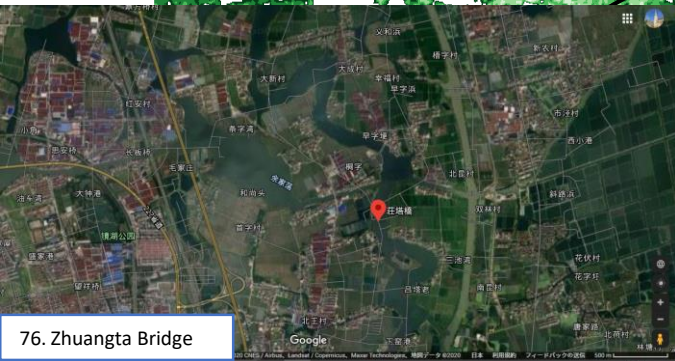
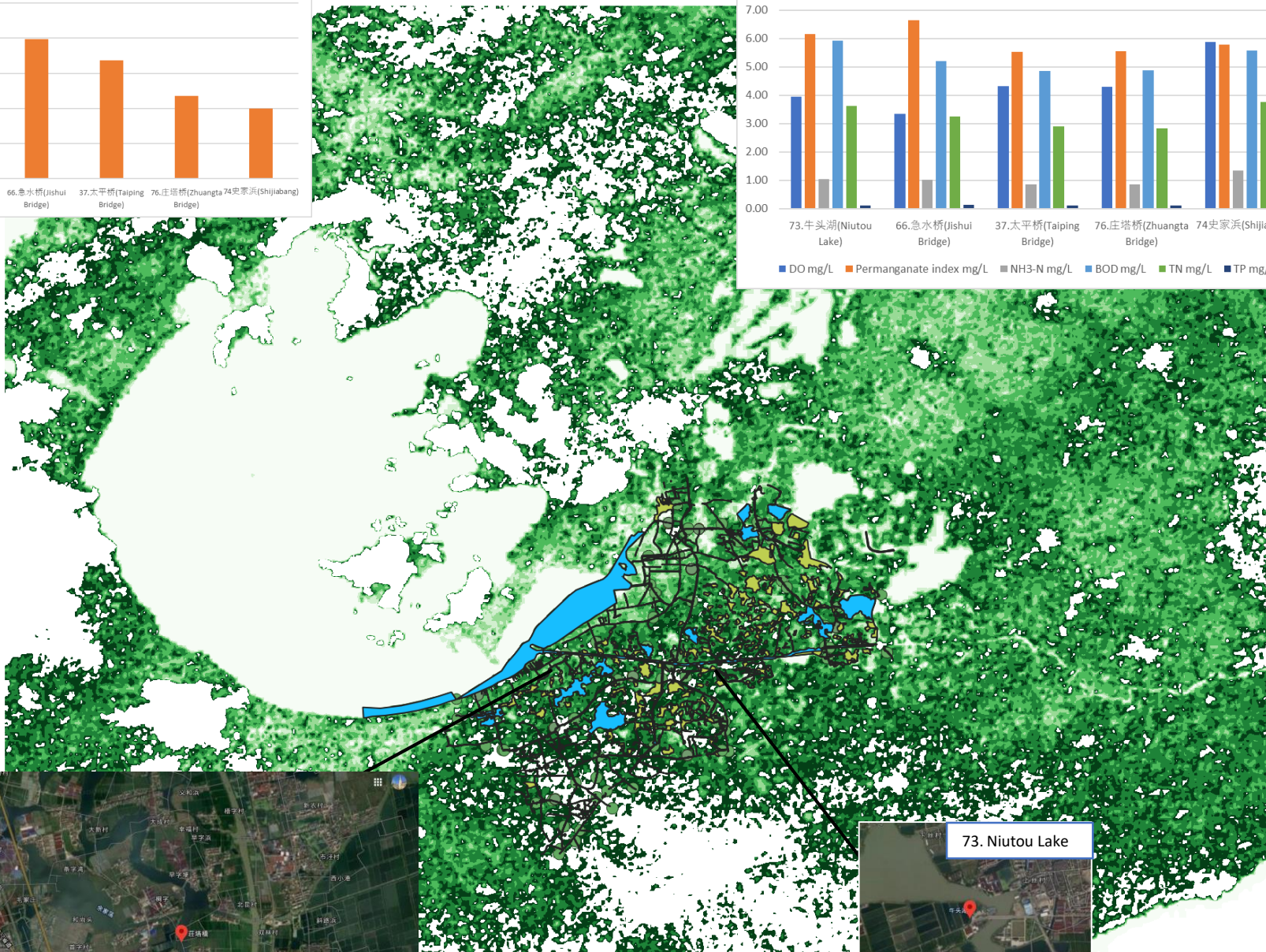
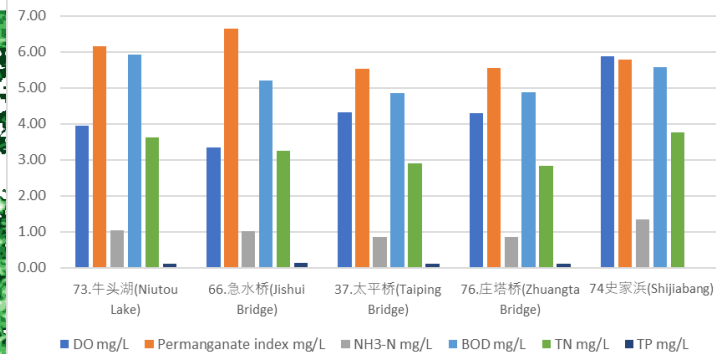
List: point with poorer water quality situation

	测站名称(Station name)	溶解氧 mg/L(dissolved oxygen)	高锰酸盐指数 mg/L(Permangan ate index)	平均值项:氨氮 mg/L(ammonia nitrogen)	平均值项:化学需 氧量mg/L(COD)	平均值项:五日生 化需氧量 mg/L(Five-day BOD)	平均值项:总氮 mg/L(total nitrogen)	平均值项:总磷 mg/L(total phosphorus)
No	Place	DO mg/L	MnO4 mg/L	NH3-N mg/L	COD mg/L	BOD mg/L	TN mg/L	TP mg/L
73	牛头湖(Niutou Lake)	6.16	5.77	1.69	23.28	3.38	3.97	0.10
66	急水桥(Jishui Bridge)	3.95	6.16	1.05	22.99	5.93	3.62	0.12
37	太平桥(Taiping Bridge)	3.35	6.64	1.02	22.68	5.19	3.25	0.13
76	庄塔桥(Zhuangta Bridge)	4.31	5.53	0.87	22.18	4.84	2.90	0.12
74	史家浜(Shijiabang)	4.29	5.56	0.86	22.00	4.87	2.82	0.12
72	云里桥(Yunli Bridge)	5.88	5.78	1.34	21.95	5.58	3.77	0.15
68	双溪桥 (Shuangxi Bridge)	4.61	5.70	1.31	21.57	4.83	4.23	0.18
33	双林塘桥(Shuanglintang Bridge)	4.46	5.98	0.66	21.21	4.41	2.60	0.10
55	严墓塘口(Yanmutang Entrance)	4.27	5.98	0.71	21.12	5.59	2.68	0.14
36	太湖苏浙边界(Jiangsu-Zhejiang border of Taihu Lake)	8.56	4.46	0.16	20.80	2.16	1.39	0.07
39	坛丘大桥(Tanqiu Bridge)	5.55	6.11	0.83	20.69	4.09	2.91	0.12
8	大德港桥(Dadegang Bridge)	4.31	6.55	0.85	20.50	5.00	2.38	0.12
56	窑港桥(Yaogang Bridge)	6.68	4.95	0.19	20.50	2.67	2.10	0.15
59	长虹桥(Changhong Bridge)	4.29	6.38	1.07	20.31	4.88	2.80	0.11
28	平望(新)(Pingwang(new))	6.59	5.66	0.46	19.76	4.10	2.50	0.11
70	铜罗至嘉兴公路桥(Tongluo- Jiaxing Highway Bridge)	3.02	6.23	0.74	19.45	5.25	2.99	0.23
71	新屯浦大桥(Xintunpu Bridge)	6.48	4.93	1.13	18.70	5.03	3.55	0.14

COD mg/L



Water Quality (worst places)



Discussions

- Higher COD was observed compared to BOD. It means that river water probably contains excess amount of non-biodegradable organic matters.
- Concerning to Total Phosphorus, they have no major differences in concentration and didn't show distinctive tendency along the river flow.
- Higher concentration was observed in lower reach regarding to Total Nitrogen even though water level was kept being higher than other water bodies.
- → It's suggested that there should be pollution sources within the area. And it's also indicated where probable pollution sources are located.
- The area is flat terrain in the Yangtze Delta, and flow rate is extremely low. Changes in flow direction were observed, and it's corresponding to tidal current. This makes it more difficult to understand situation, therefore modelling approach is prepared to assess water environment condition.
- Considering these analyses and discussion, we're planning to continue further research to detect pollution sources and to understand situation in the area.

References

- Pu, P. and Yan, J. (1998) Taihu Lake-A Large Shallow Lake in The East China Plain. *Journal of Lake Sciences* 10(Suppl.), 1-12.
- Qin, B.Q., Xu, P.Z., Wu, Q.L., Luo, L.C. and Zhang, Y.L. (2007) Environmental issues of Lake Taihu, China. *Hydrobiologia* 581, 3-14.
- Li, J. (2018) Research Report on East Taihu Environmental Research Project in 2018.

Thank you for your online participation!

