

Research on reservoir dispatching scheme based on ecological flow guarantee

基于生态流量保障的水库调度方案研究

Presenter: Yibin Yang

汇报人: 杨一彬

Email: 799226707@qq.com

电子邮箱: 799226707@qq.com

Pearl River Water Resources Research Institute

珠江水利科学研究院

Content

- **01 Research on the background**
研究背景
- **02 Basic situation**
基本情况
- **03 Ecological discharge**
生态流量
- **04 Ecological flow scheduling**
生态流量调度
- **05 Conclusion**
结语

01 Research on the background (研究背景)

Ensuring the ecological flow of rivers and lakes is a basic requirement for strengthening the management and control of water resources development and utilization, and promoting the ecological protection and restoration of rivers and lakes, and is an important measure for building water ecological civilization. To carry out the work of determining and guaranteeing the ecological flow of rivers and lakes is the responsibility of the water conservancy department to guide the ecological flow of rivers and lakes, and it is an important content of the strong supervision of the water conservancy industry, and also an important content of the assessment of the most stringent water resources management system.

保障河湖生态流量是加强水资源开发利用管控、推进河湖生态保护修复的基本要求，是建设水生态文明的一项重要举措。开展河湖生态流量确定和保障工作是水利部门履行指导河湖生态流量水量管理的职责，是水利行业强监管的重要内容，也是实行最严格水资源管理制度考核的重要内容。



02 Basic situation (基本情况)

● Suijiang River (绥江水系)

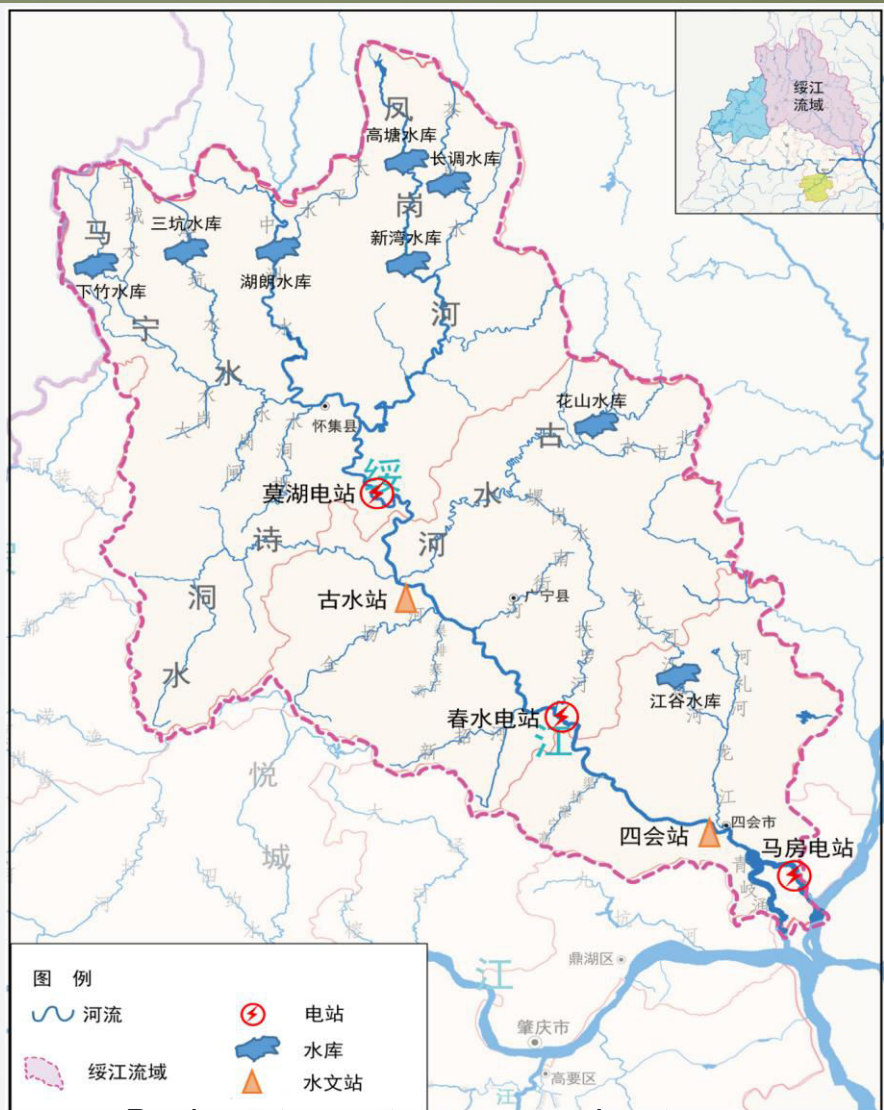
Suijiang River flows through three counties, HuaiJi, GuangNing, SiHui in ZhaoQing City of Guangdong Province, and joins BeiJiang River at Sihui horse House, with a total length of 226km and a catchment area of 7184 km².

绥江流经广东省肇庆市怀集、广宁、四会，在四会马房汇入北江，干流全长226km，集水面积7184 km²。

● Suijiang water resources development and utilization (绥江水资源开发利用)

The annual average water resources of the basin are 8.17 billion m³, and the total water consumption in 2022 is 824 million m³. The efficiency of water resources development and utilization is 8.86%, and there are MoHu Hydropower Station, ChunShui Hydropower Station, MaFang Hydropower Station and eight medium-sized reservoirs..

流域多年平均水资源总量81.70亿m³，2022年总用水量8.24亿m³，水资源开发利用效率为8.86%，有莫湖电站、春水电站、马房电站以及8宗中型水库。



Basin water system map and water conservancy project distribution map
流域水系图及水利工程分布图

02 Basic situation (基本情况)

● XinXing River (新兴江水系)

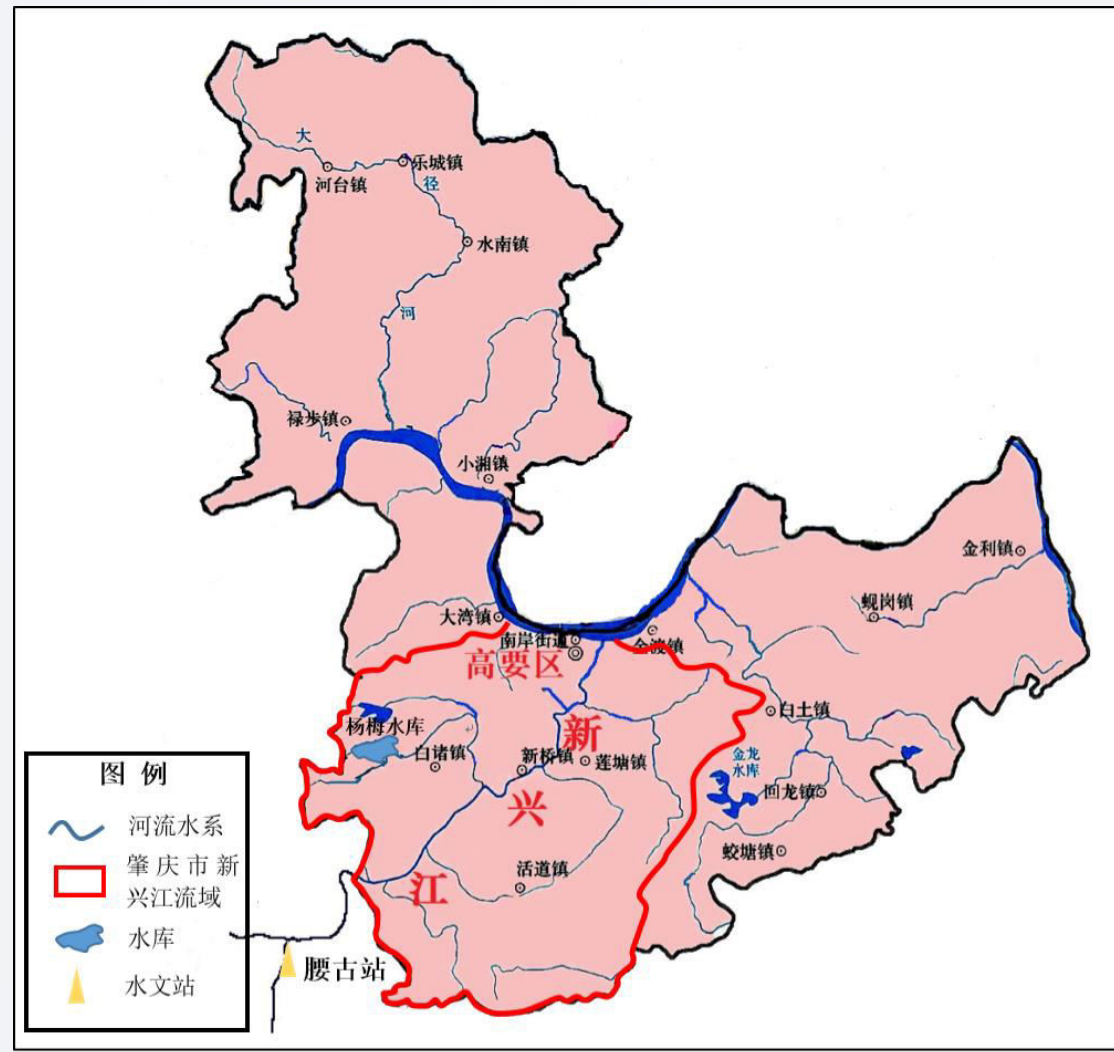
XinXing River originates from TianLu Mountain, XinXing County in YunFu City of GuangDong Province, and flows west from NanAn Town in GaoYao District of ZhaoQing City, with a total length of 145km and a catchment area of 2355km²..

新兴江发源于广东省云浮市新兴县天露山，于肇庆市高要区南岸镇注入西，干流全长145km，集水面积2355km²。

● XinXing River water resources development and utilization (新兴江水资源开发利用)

The annual average water resources of the basin are 2.073 billion m³, and the total water consumption in 2022 is 440 million m³. The efficiency of water resources development and utilization is 22.83%, and one medium-sized reservoir is YangMei Reservoir.

流域多年平均水资源总量20.73亿m³，2022年总用水量4.40亿m³，水资源开发利用效率为22.83%，有一宗中型水库为杨梅水库。



Basin water system map and water conservancy project distribution map
流域水系图及水利工程分布图

03 Ecological discharge (生态流量)

● Ecological discharge of Suijiang River (绥江生态流量)

In Suijiang River basin, MoHu Hydropower Station control section, WaZao gang control section and MaFang HydroPower station control section were selected to analyze and calculate the ecological discharge of $11.20\text{m}^3/\text{s}$, $20.79\text{m}^3/\text{s}$ and $24.50\text{m}^3/\text{s}$, respectively, by using Tennant method and the method of the lowest monthly average of different frequencies.

绥江流域选取莫湖电站控制断面、瓦灶岗控制断面以及马房电站控制断面，采用Tennant法和不同频率最枯月平均值法综合分析计算得到生态流量分别为 $11.20\text{m}^3/\text{s}$ 、 $20.79\text{m}^3/\text{s}$ 、 $24.50\text{m}^3/\text{s}$ 。



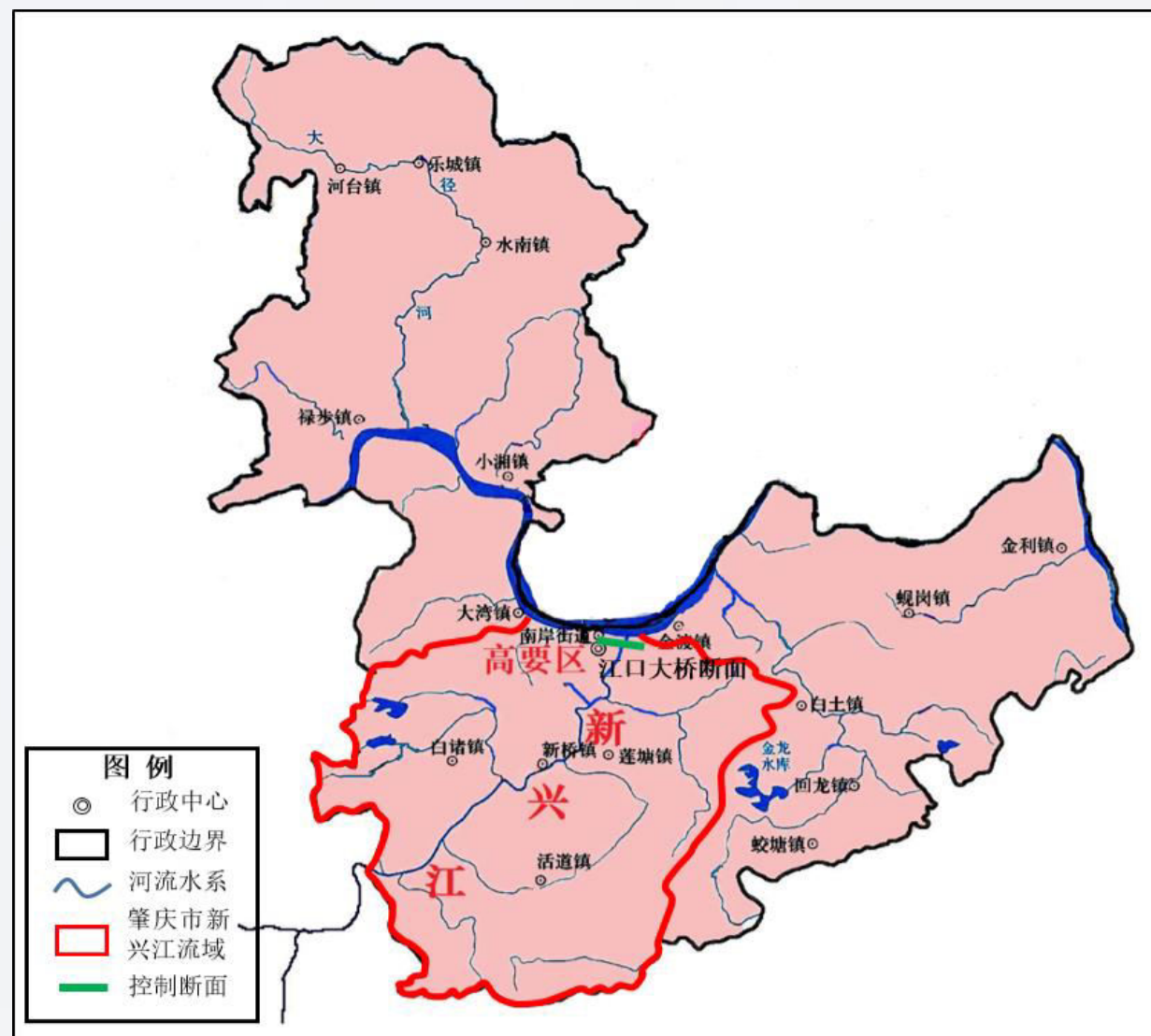
Suijiang River ecological flow control section
绥江生态流量控制断面

03 Ecological flow (生态流量)

● Ecological discharge of XinXing River (新兴江生态流量)

The control section of JiangKou Bridge in XinXing River basin was selected, and the ecological discharge was calculated by using Tennant method and the average value of the last month at different frequencies, which were $7.03\text{m}^3/\text{s}$, respectively.

新兴江流域选取江口大桥控制断面，采用Tennant法和不同频率最枯月平均值法综合分析计算得到生态流量分别为 $7.03\text{m}^3/\text{s}$ 。



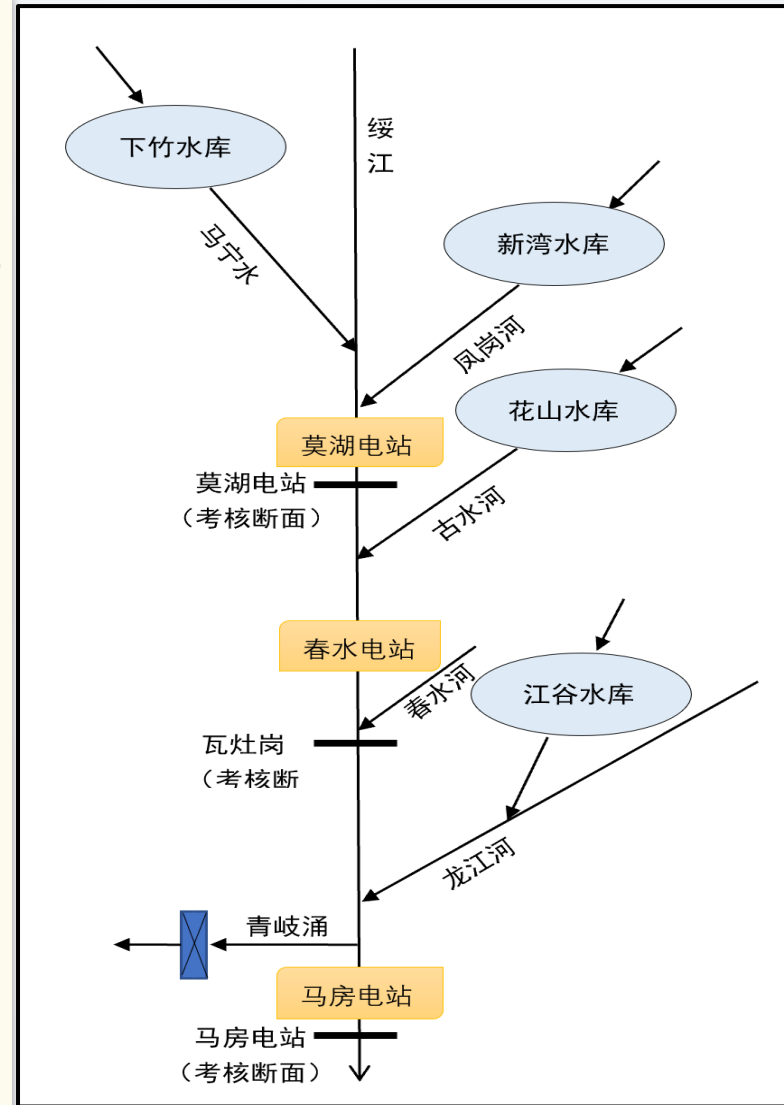
XinXing River ecological flow control section
新兴江生态流量控制断面

04 Ecological flow scheduling (生态流量调度)

● Suijiang River ecological flow scheduling (绥江生态流量调度)

XinWan Reservoir (60.6 million m³), XiaZhu Reservoir (53.9 million m³), SanKeng Reservoir (44.64 million m³) and JiangGu Reservoir (12.04 million m³) were selected as the backbone reservoirs for dispatching. When Xinwan Reservoir and XiaZhu Reservoir were preferred for dispatching, but still could not meet the ecological flow control target, SanKeng reservoir and JiangGu Reservoir participated in the joint dispatching. According to the discharge of water from other cascaded hydropower stations in the main stream of SuiJiang River, the upstream water shall not be intercepted and stored. When necessary, start as many other reservoirs as possible to participate in the joint operation, and jointly safeguard the ecological flow control index of the ecological flow control section.

选取新湾水库 (6060万m³)、下竹水库 (5390万m³)、三坑水库 (4464万m³)、江谷水库 (1204万m³) 作为调度骨干水库, 优先选择新湾水库、下竹水库调度, 仍然不能满足生态流量控制目标时, 三坑水库、江谷水库参与联合调度。绥江干流其他梯级水电站根据来水下泄, 对上游来水不得截留拦蓄。必要时启动尽可能多的其他水库参与联合调度, 共同保障生态流量控制断面生态流量控制指标。



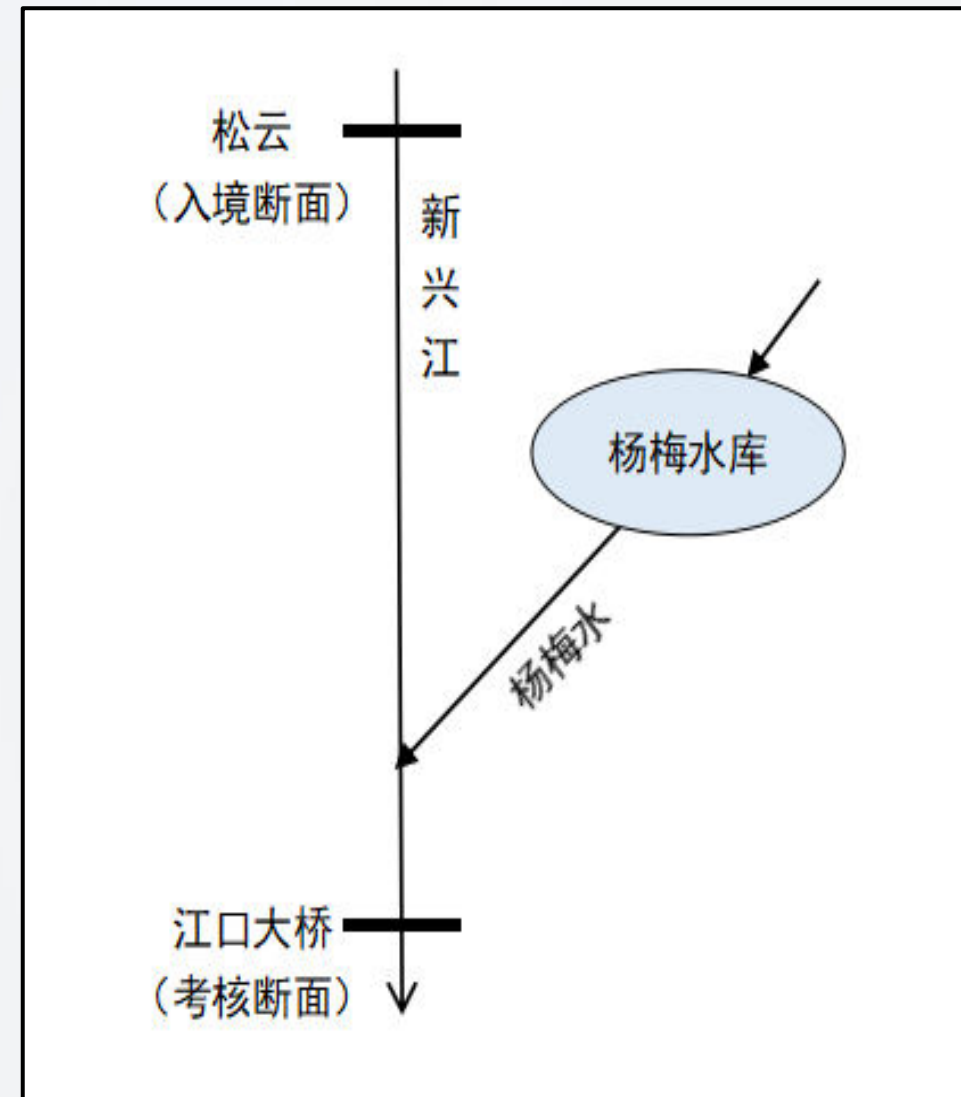
Suijiang River ecological flow scheduling
绥江生态流量调度

04 Ecological flow scheduling (生态流量调度)

● XinXing River ecological flow scheduling (新兴江生态流量调度)

YangMei Reservoir (23.35 million m³) is selected as the dispatching backbone reservoir of XinXing River Basin, and the incoming water from the control section of JiangKou Bridge is affected by the upstream incoming water. When the ecological flow warning occurs, the ecological flow dispatching between the control section of JiangKou Bridge and SongYun section is started, and the discharge water from YangMei Reservoir is increased to ensure the ecological flow control index of the control section of JiangKou Bridge.

选取杨梅水库 (2335万m³) 作为新兴江流域的调度骨干水库, 江口大桥控制断面来水受上游来水影响, 当发生生态流量预警时, 启动江口大桥控制断面至松云断面区间的生态流量调度, 由杨梅水库加大下泄水量, 保障江口大桥控制断面生态流量控制指标。



新兴江 River ecological flow scheduling
新兴江生态流量调度

Ensuring the reasonable ecological flow of rivers is an important starting point for implementing the deployment of ecological flow control of the Ministry of Water Resources, promoting the reform and development of water conservancy in the new era and the supervision of the water conservancy industry, and fulfilling the responsibilities of water administrative departments. At the same time, it is beneficial to strengthen the water management of the basin and promote the protection and restoration of the water ecosystem.

保障河流合理生态流量，是落实水利部生态流量管控工作部署，推进新时期水利改革发展和水利行业监管，履行水行政主管部门职责的重要抓手。同时有利于加强流域水量调度管理，促进水生态系统保护与修复。



Thanks for listening!

Presenter: Yibin Yang

汇报人：杨一彬

Email: 799226707@qq.com

电子邮箱：799226707@qq.com

Pearl River Water Resources Research Institute

珠江水利科学研究院