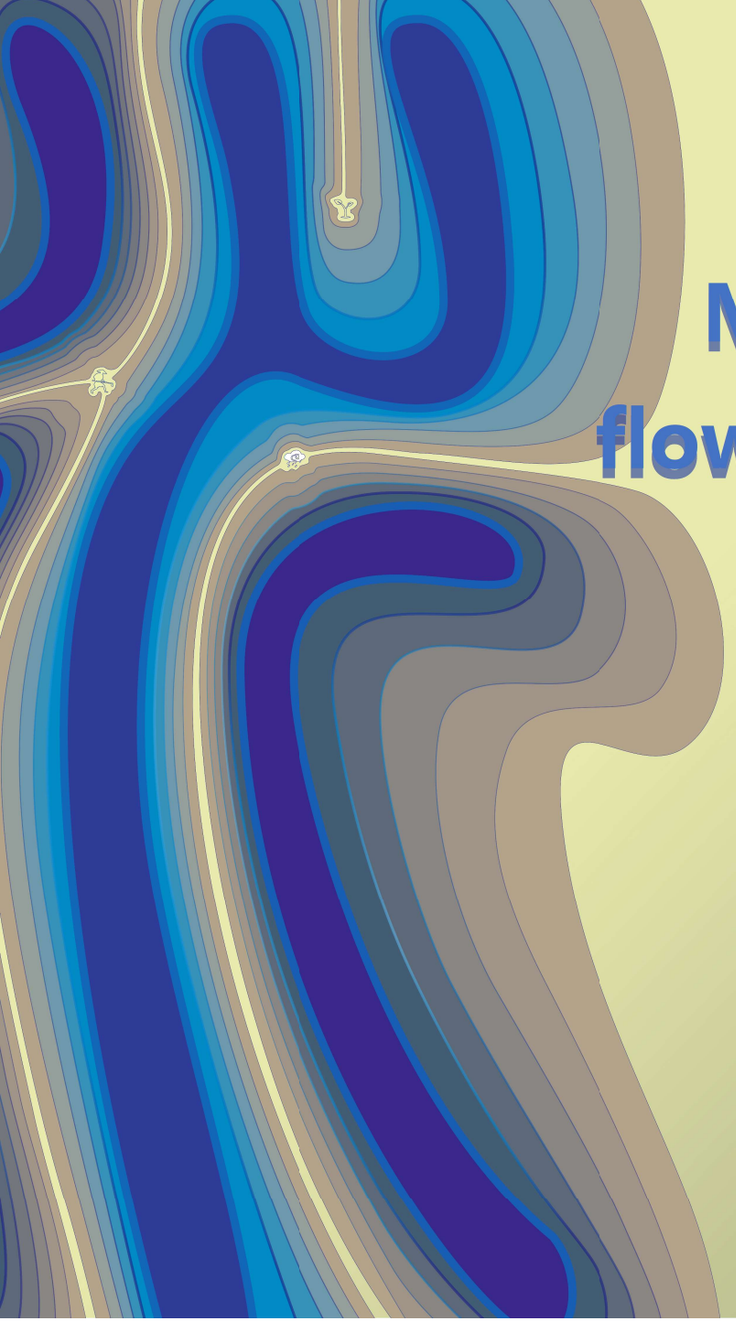

XVIII World Water Congress
International Water Resources Association (IWRA)

Management mechanism of ecological flow of rivers and lakes based on human-water harmony and watershed conception

TangLi

Taihu Basin Authority of Ministry of Water Resources （TBA）

XVIII WORLD WATER CONGRESS Water for All Harmony between Humans and Nature

第18届 世界水资源大会 水与万物：人与自然和谐共生

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International Water Resources Association (IWRA)

Contents

- Background
- Basic situation of typical rivers and lakes
- Practice of ecological flow (water level) guarantee
- Main experiences and problems
- Inspiration and ideas on deepening the protection of ecological flow in river basins

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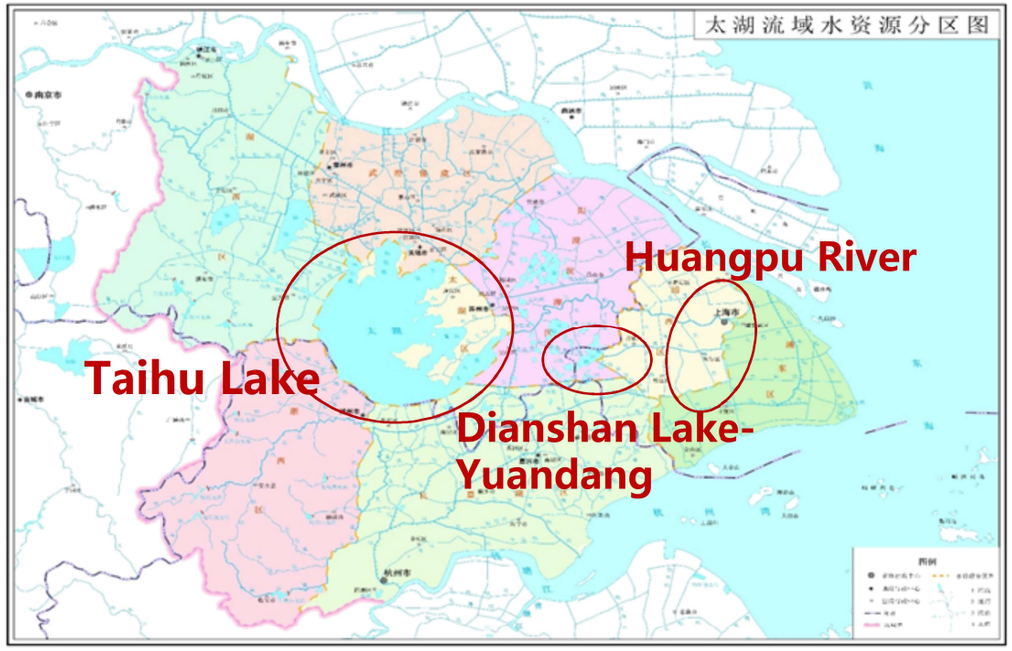
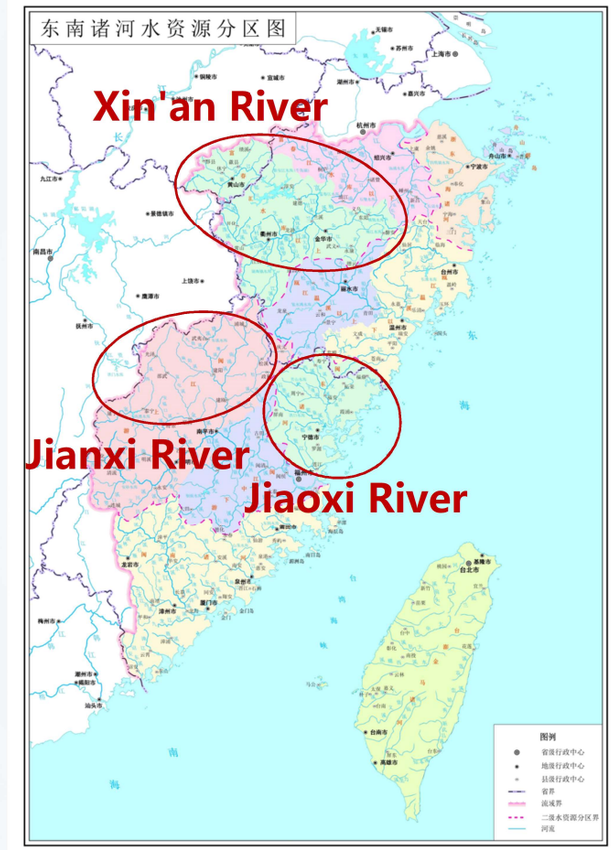
01 Background

- In March 2019, the Ministry of Water Resources fully deployed and launched the **determination and guarantee of ecological flow targets** for national key rivers and lakes.
- Setting goals—taking actions—achieving effects
- The key assessment section compliance rate is **99.99 %.**





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02 Basic situation of typical rivers and lakes

02 Basic situation of typical rivers and lakes

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- **246000 km²**
- **Jiangsu, Zhejiang, Shanghai, Fujian, Anhui province**
- **various types of rivers and lakes**

Name	Acreage (10000 km²)	Main features	Protected objects	
Taihu Lake	3.69	• in plain river network • large regulation and storage lakes	•morphology •habitat •self-purification capacity	• drinking water source protection area • aquatic germplasm resource protection area • important wetland
Huangpu River	0.52	• tidal river		• drinking water source protection area • moisture and salt prevention
Xin'an River	1.21	• typical branched rivers • large and medium-sized water conservancy and hydropower projects according with ecological flow assessment requirements		• drinking water source protection areas nature reserves • aquatic germplasm resources protection areas • important wetlands
Oujiang River	1.81			• nature reserves • aquatic germplasm resources reserves • important wetlands
Songxi River	0.48	• mountainous source rivers • low degree of development and utilization		• **aquatic germplasm resources protection area**

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03 Practice of ecological flow (water level) guarantee

Taihu Lake

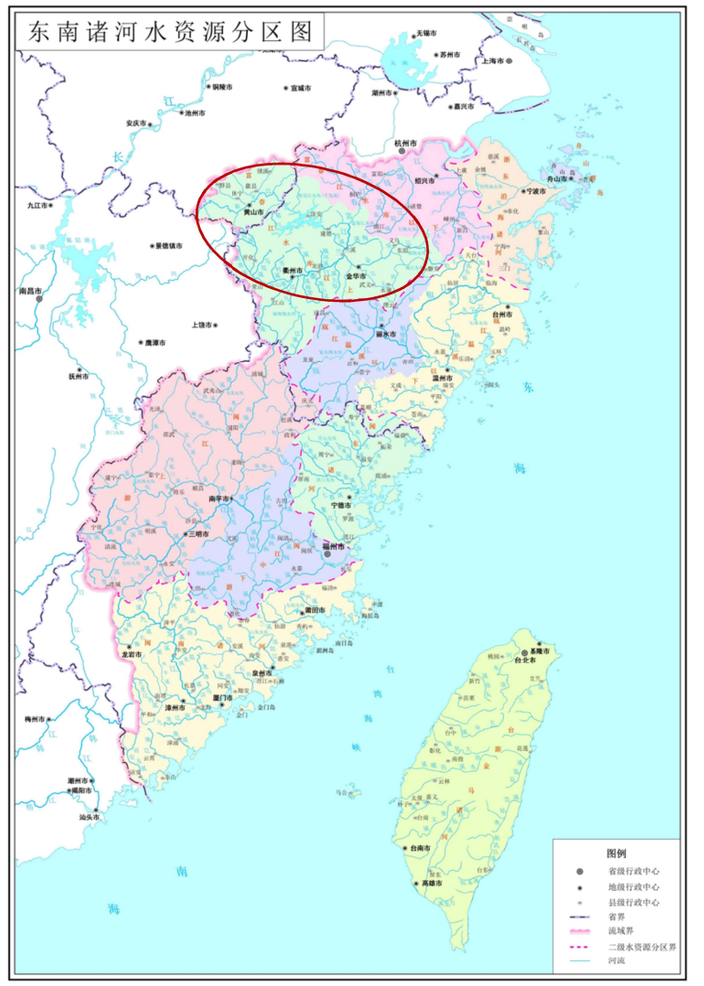
- the largest lake in the basin
- flood and water conservation center
- calculation method ： Q90
- the lowest ecological water level ： 2.65r
- evaluation time ： day
- design frequency ： 90%

■ Huangpu River

- main drainage channel in the basin
- tidal river
- Calculation method : 30% Tennant
- Sensitive ecological flow : 90m³/s
- evaluation time : day
- design frequency : 90%

■ Xin'an River

- Important ecological barriers and strategic water sources in the Yangtze River Delta region
- calculation method :
  - Jiekou section of provincial boundary——The driest daily average flow Q90 method
  - Reservoir dam site section——The dryest ten-day average flow Q90 method
- ecological base flow :
  - Jiekou section of provincial boundary——7.7m³/s
  - Reservoir dam site section——19.5m³/s
- design frequency : 90%

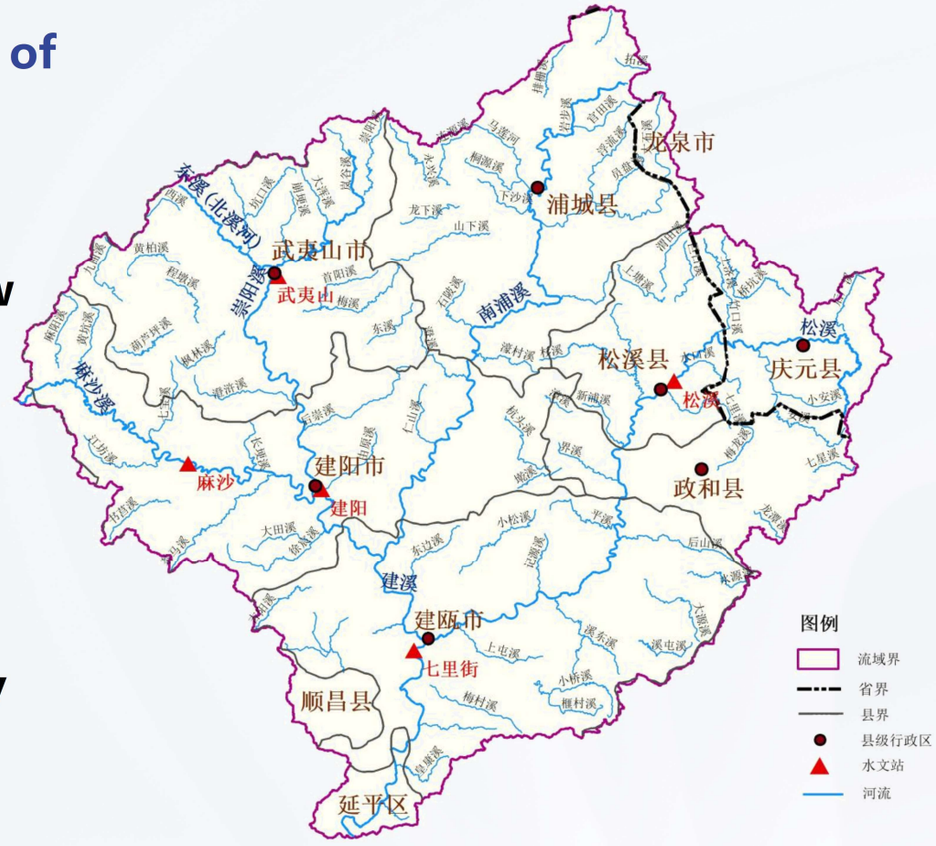


Oujiang River

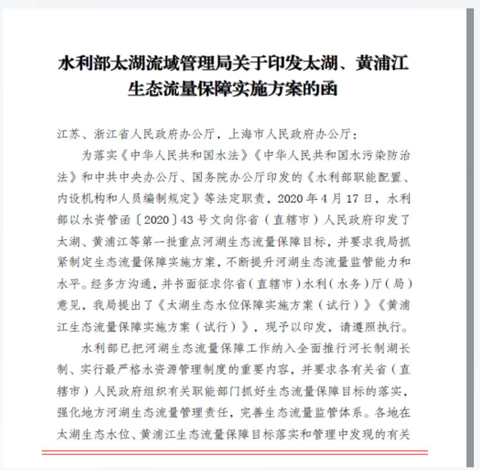
- The second largest river in Zhejiang Province
- calculation method ： The driest daily average flow Q90 method.
- ecological base flow ： 21m³/s
- evaluation time ： day
- the design frequency ： 90%

■ Songxi River

- one of the three major tributaries in the upper reaches of Jianxi River
- spanning Zhejiang and Fujian provinces.
- calculation method : The lowest monthly average flow Q90
- ecological base flow : 2.5m³/s
- evaluation time : day
- the design frequency : 90%
- sensitive ecological flow : 14.7 m3/s （May—June) by Tennant method



- object—section—target—measure—responsibility
- monitoring and information sharing, water project scheduling, intake water controling, warning and other safeguards
- the main body of guarantee and supervision

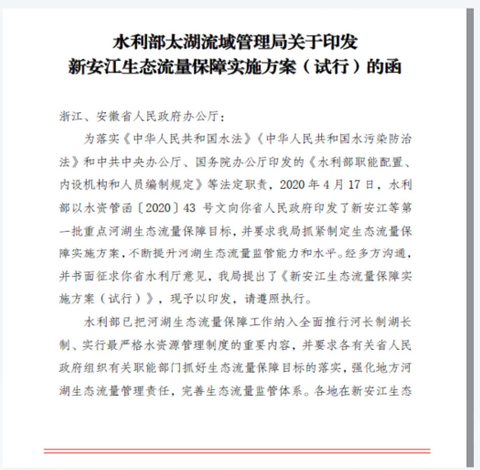


水利部太湖流域管理局关于印发太湖、黄浦江生态流量保障实施方案的函

江苏、浙江省人民政府办公厅，上海市人民政府办公厅：

为落实《中华人民共和国水法》《中华人民共和国水污染防治法》和中共中央办公厅、国务院办公厅印发的《水利部职能配置、内设机构和人员编制规定》等法定职责，2020年4月17日，水利部以水资管函〔2020〕43号文向你省（直辖市）人民政府印发了太湖、黄浦江等第一批重点河湖生态流量保障目标，并要求我局抓紧制定生态流量保障实施方案，不断提升河湖生态流量监管能力和水平。经多方沟通，并书面征求你省（直辖市）水利（水务）厅（局）意见，我局提出了《太湖生态水位保障实施方案（试行）》《黄浦江生态流量保障实施方案（试行）》，现予以印发，请遵照执行。

水利部已把河湖生态流量保障工作纳入全面推行河长制湖长制、实行最严格水资源管理制度的重要内容，并要求各有关省（直辖市）人民政府组织有关职能部门抓好生态流量保障目标的落实，强化地方河湖生态流量管理责任，完善生态流量监管体系。各地在太湖生态水位、黄浦江生态流量保障目标落实和管理中发现的有关

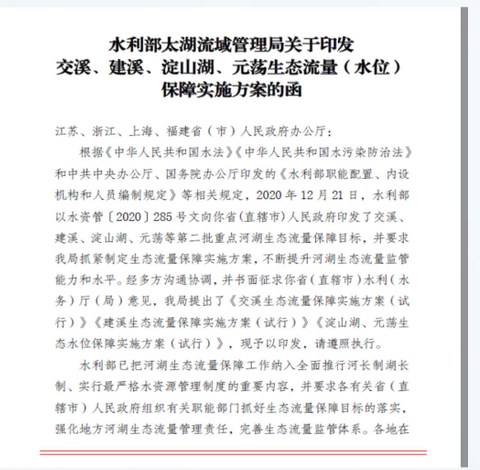


水利部太湖流域管理局关于印发
新安江生态流量保障实施方案（试行）的函

浙江、安徽省人民政府办公厅：

为落实《中华人民共和国水法》《中华人民共和国水污染防治法》和中共中央办公厅、国务院办公厅印发的《水利部职能配置、内设机构和人员编制规定》等法定职责，2020年4月17日，水利部以水资管函〔2020〕43号文向你省人民政府印发了新安江等第一批重点河湖生态流量保障目标，并要求我局抓紧制定生态流量保障实施方案，不断提升河湖生态流量监管能力和水平。经多方沟通，并书面征求你省水利厅意见，我局提出了《新安江生态流量保障实施方案（试行）》，现予以印发，请遵照执行。

水利部已把河湖生态流量保障工作纳入全面推行河长制湖长制、实行最严格水资源管理制度的重要内容，并要求各有关省人民政府组织有关职能部门抓好生态流量保障目标的落实，强化地方河湖生态流量管理责任，完善生态流量监管体系。各地在新安江生态

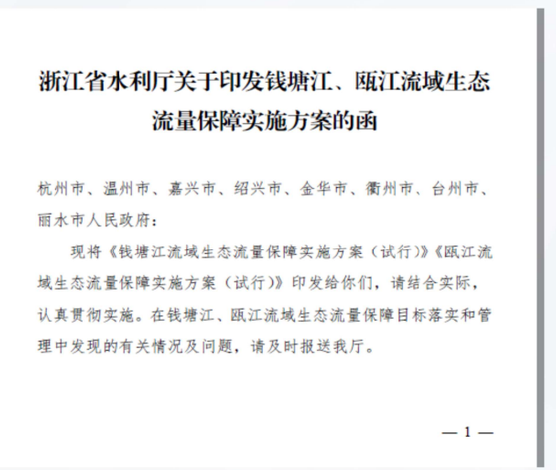


水利部太湖流域管理局关于印发
交溪、建溪、淀山湖、元荡生态流量（水位）
保障实施方案的函

江苏、浙江、上海、福建省（市）人民政府办公厅：

根据《中华人民共和国水法》《中华人民共和国水污染防治法》和中共中央办公厅、国务院办公厅印发的《水利部职能配置、内设机构和人员编制规定》等相关规定，2020年12月21日，水利部以水资管〔2020〕285号文向你省（直辖市）人民政府印发了交溪、建溪、淀山湖、元荡等第二批重点河湖生态流量保障目标，并要求我局抓紧制定生态流量保障实施方案，不断提升河湖生态流量监管能力和水平。经多方沟通协调，并书面征求你省（直辖市）水利（水务）厅（局）意见，我局提出了《交溪生态流量保障实施方案（试行）》《建溪生态流量保障实施方案（试行）》《淀山湖、元荡生态水位保障实施方案（试行）》，现予以印发，请遵照执行。

水利部已把河湖生态流量保障工作纳入全面推行河长制湖长制、实行最严格水资源管理制度的重要内容，并要求各有关省（直辖市）人民政府组织有关职能部门抓好生态流量保障目标的落实，强化地方河湖生态流量管理责任，完善生态流量监管体系。各地在



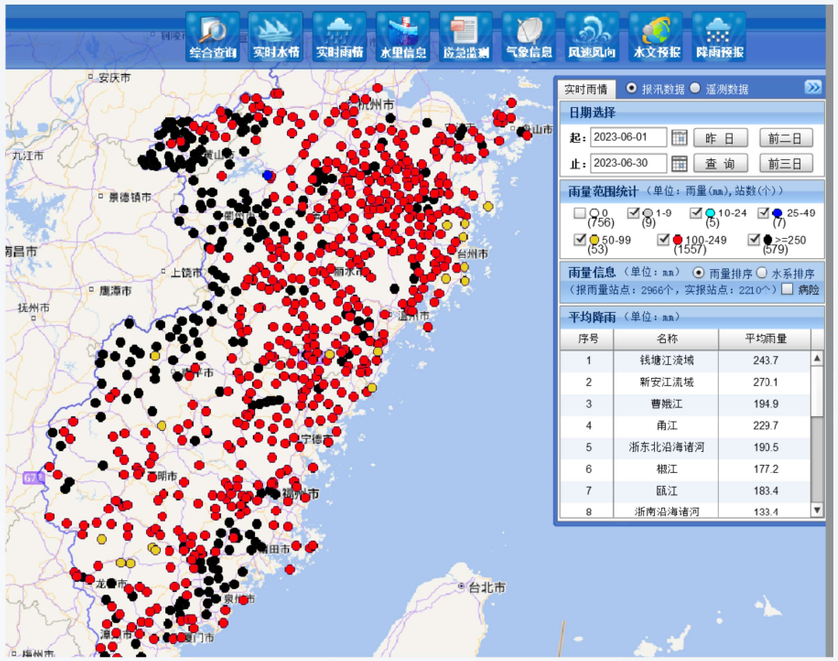
浙江省水利厅关于印发钱塘江、瓯江流域生态流量保障实施方案的函

杭州市、温州市、嘉兴市、绍兴市、金华市、衢州市、台州市、丽水市人民政府：

现将《钱塘江流域生态流量保障实施方案（试行）》《瓯江流域生态流量保障实施方案（试行）》印发给你们，请结合实际，认真贯彻实施。在钱塘江、瓯江流域生态流量保障目标落实和管理中发现的有关情况及问题，请及时报送我厅。

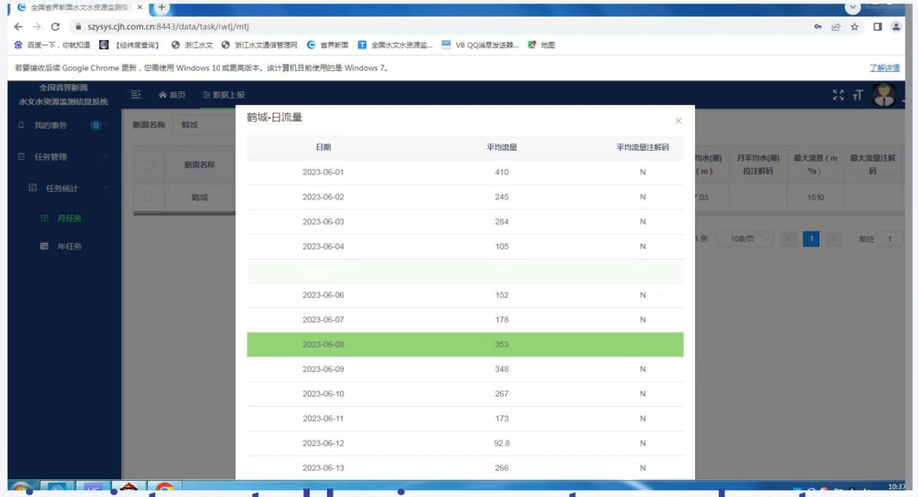
— 1 —

Strengthen hydrological monitoring and warning management



Water regime exchange system

The first intelligent control system for ecological flow of mountainous source type rivers in the basin

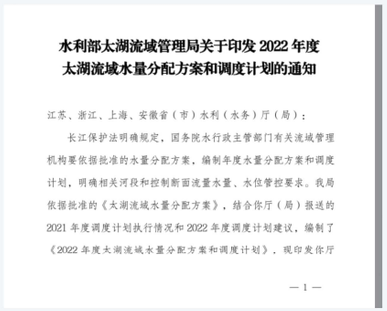


Water regime integrated business system and water resources management information system of Zhejiang province

Strengthen hydrological monitoring and warning management

Serial number	Name	Control section	Early warning of ecological flow （Since 2020）
1	Taihu Lake	Water level of the Taihu Lake	No warning throughout the year
2	Huangpu River	Section of Songpu Bridge on Huangpu River	Orange warning (2022.8.16-22)
3	Xin'an River	Jiekou Section of Xin 'anjiang Provincial Boundary	Blue warning (2022.9.22) Orange warning (2022.9.23-10.5,10.13-12.1) Red warning (2022.10.6-10.12)
4	Xin'an River	Luotongbu section of Xin 'anjiang Reservoir	No warning throughout the year
5	Oujiang River	Hecheng Hydrological Station	No warning throughout the year
6	Songxi River	Songxi Zhejiang-Fujian provincial boundary section	**In 2021.9, blue, orange and red warnings were triggered successively**

Implement annual total water consumption control



水利部太湖流域管理局关于印发 2022 年度
太湖流域水量分配方案和调度计划的通知

江苏、浙江、上海、安徽省（市）水利（水务）厅（局）：

长江保护法明确规定，国务院水行政主管部门有关流域管理机构要依据批准的水量分配方案，编制年度水量分配方案和调度计划，明确相关河段和控制断面流量水量、水位管控要求。我局依据批准的《太湖流域水量分配方案》，结合你厅（局）报送的2021 年度调度计划执行情况和 2022 年度调度计划建议，编制了《2022 年度太湖流域水量分配方案和调度计划》，现印发你厅

— 1 —

水利部太湖流域管理局关于印发 2022 年度
新安江流域水量分配方案和调度计划的通知

安徽省、浙江省水利厅：

《中华人民共和国水法》等水法规明确规定，国务院水行政主管部门有关流域管理机构要依据批准的水量分配方案，编制年度水量分配方案和调度计划，实施水量统一调度。我局依据批准的《新安江流域水量分配方案》，结合你厅报送的 2021 年度调度计划执行情况和 2022 年度调度计划建议，编制了 2022 年度新安江流域水量分配方案和调度计划，现印发你厅，请认真组织实施。

水利部太湖流域管理局
2022 年 3 月 10 日

— 1 —

Annual water allocation scheme and scheduling plan are issued

2021 年度太湖流域水量分配方案
一季度评估及二季度调整

2021 年度太湖流域水量分配方案
二季度评估及三季度调整

2021 年度太湖流域水量分配方案
三季度评估及四季度调整

2021 年度太湖流域水量分配方案
执行情况评估

一、水雨情

2021 年太湖流域降水量 1370.4mm，较常年略偏多，年降水频率 15%。全年降水空间分布总体南部大于北部。各水利分区中降水量最大的为浙西区 1709.2mm，最小为武澄锡虞区 1138.7mm，与常年相比，浦东浦西区、浙西区、杭嘉湖区降水量偏多 14%~24%，其余分区基本持平。详见表 1。

表 1　2021 年太湖流域降水量与多年平均比较

分类	流域平均	湖西区	武澄锡虞区	阳澄淀泖区	太湖区	杭嘉湖区	浙西区	浦东浦西区
全年	1370.4	1188.2	1138.7	1195.7	1264.6	1481.2	1709.2	1493.4
距平	9%	-2%	-2%	2%	5%	14%	16%	24%

图 1　2021 年太湖流域各水利分区降水量与常年对比图

太湖年初水位 3.00m，年初水位 3.04m，年平均水位

2021 年度一季度新安江流域水量分配
方案执行情况评估

2021 年度二季度新安江流域水量分配
方案执行情况评估

2021 年度三季度新安江流域水量分配
方案执行情况评估

2021 年度新安江流域水量分配
方案执行情况评估

一、水雨情

1. 雨情

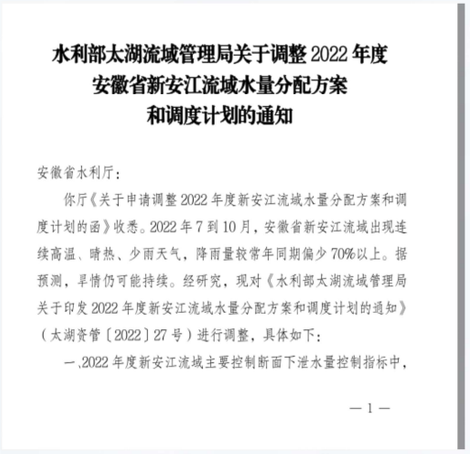
2021 年新安江流域累计降水量为 1793.4 毫米。经统计，新安江流域 2021 年降水量较多年平均（1986-2015 年，以下同）降水量偏少 0.02%，降水频率约为 P=36%。在时程分配上，一、四季度流域降水量均较多年平均偏少，减幅最大约为 25.33%；二、三季度流域降水量均较多年平均偏多，增幅最大约为 15.68%。

图 1　新安江流域逐季度降水量过程图

2. 水情

基于新安江流域实测降水、蒸发数据及流域水量分配模型，经计算，新安江流域 2021 年产水量约为 133.31 亿立方米，较多

Carry out quarterly review assessments



水利部太湖流域管理局关于调整 2022 年度
安徽省新安江流域水量分配方案
和调度计划的通知

安徽省水利厅：

你厅《关于申请调整 2022 年度新安江流域水量分配方案和调度计划的函》收悉。2022 年 7 到 10 月，安徽省新安江流域出现连续高温、晴热、少雨天气，降雨量较常年同期偏少 70%以上。据预测，旱情仍可能持续。经研究，现对《水利部太湖流域管理局关于印发 2022 年度新安江流域水量分配方案和调度计划的通知》（太湖资管〔2022〕27 号）进行调整，具体如下：

一、2022 年度新安江流域主要控制断面下泄水量控制指标中，

— 1 —

Dynamic adjustment update

03 Practice of ecological flow (water level) guarantee

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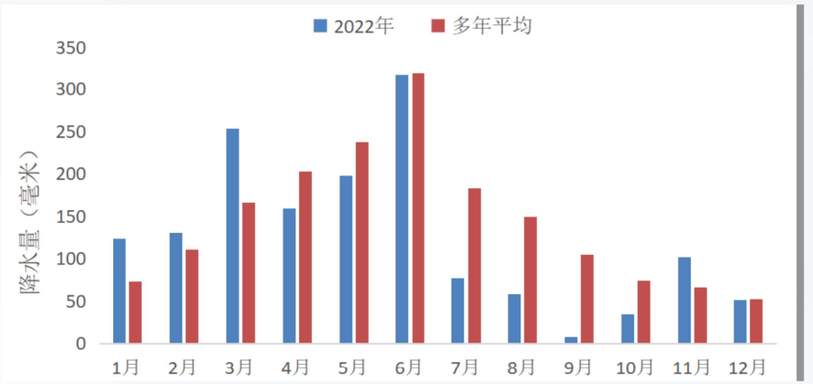
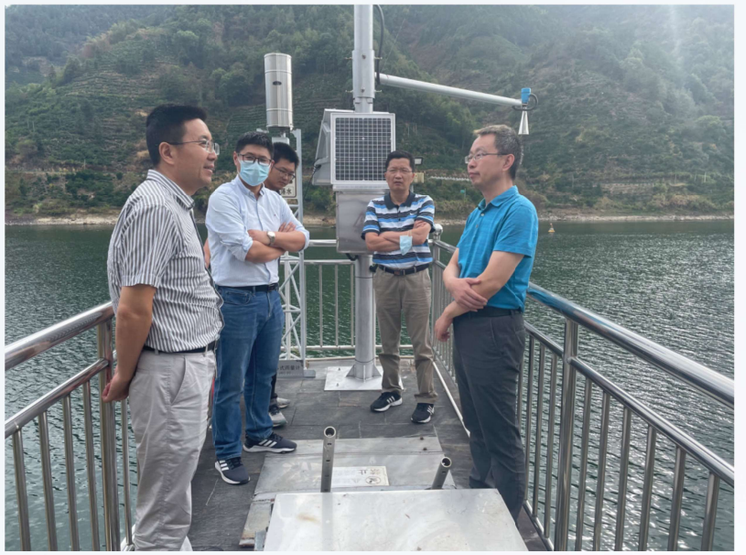
- **Carry out optimal scheduling of water projects**
  - The **ecological base flow** of Hecheng hydrological station, the **ecological flow control objectives** of large reservoirs in the basin and the water allocation outside the river are all **included in the scheduling scheme**.
  - continuous drought in summer, autumn, and winter In 2022
  - TBA provide on-site guidance to ensure that ecological flow is **not or minimized damaged** as much as possible.





Implement supervision and assessment

Serial number	Major rivers and lakes	Compliance rate
1	Taihu Lake	Nearly 100 %
2	Huangpu River	Nearly 100 %
3	Xin'an River	Nearly 100 %
4	Xin'an River	Nearly 100 %
5	Oujiang River	98.2%
6	Songxi River	93.7% in 2021, 99.41% in 2022

XVIII World Water Congress
International Water Resources Association (IWRA)

04 Main experiences and problems

04 Main experiences and existing problems

XVIII World Water Congress
International Water Resources Association (IWRA)

Experiences

1
- Classify, identify and calculate ecological protection objects and water needs
- Conduct research and comparison on the rationality and accessibility of objectives using multiple methods
- technical guidance to local authorities

2
- Create a small flow ecological flow monitoring model for mountain source rivers
- 24-hour online monitoring station for chloride ion of Songpu Bridge on Huangpu River——a demonstration site for monitoring ecological flow of tidal rivers.

Experiences

3

- Ecological flow monitoring and early warning module
- All-weather online monitoring and supervision of inter-provincial rivers and lakes ecological flow (water level)
- daily monitoring—monthly consultation——annual evaluation——response to emergencies

4

- Working rules for early warning and response of ecological flow (water level) of TBA
- Xin'an River Basin Water Resources Scheduling Consultation and Cooperation Mechanism

■ Problems

The scientific nature of the goal of rivers and lakes ecological flow guarantee is generally lacking.

- **Monitoring data, technical data and research results are generally difficult to support the identification of ecological protection objects and the quantitative calculation of water demand.**
- **The applicability of the existing calculation methods is not strong, and the determination of the ecological flow guarantee target of rivers and lakes needs long-term exploration and deepening research.**

Problems

Ecological flow guarantee project and scheduling measures are weak.

- **Ecological flow protection engineering measures are generally less.**
- **The scheduling scheme generally focuses on flood control and water supply scheduling, and the overall consideration of water demand in the sensitive period of aquatic organism growth is insufficient.**

Problems

The construction of ecological flow guarantee mechanism lags behind.

- **Multiple departments and stakeholders involved.**
- **Ecological flow management systems and measures are relatively dispersed.**

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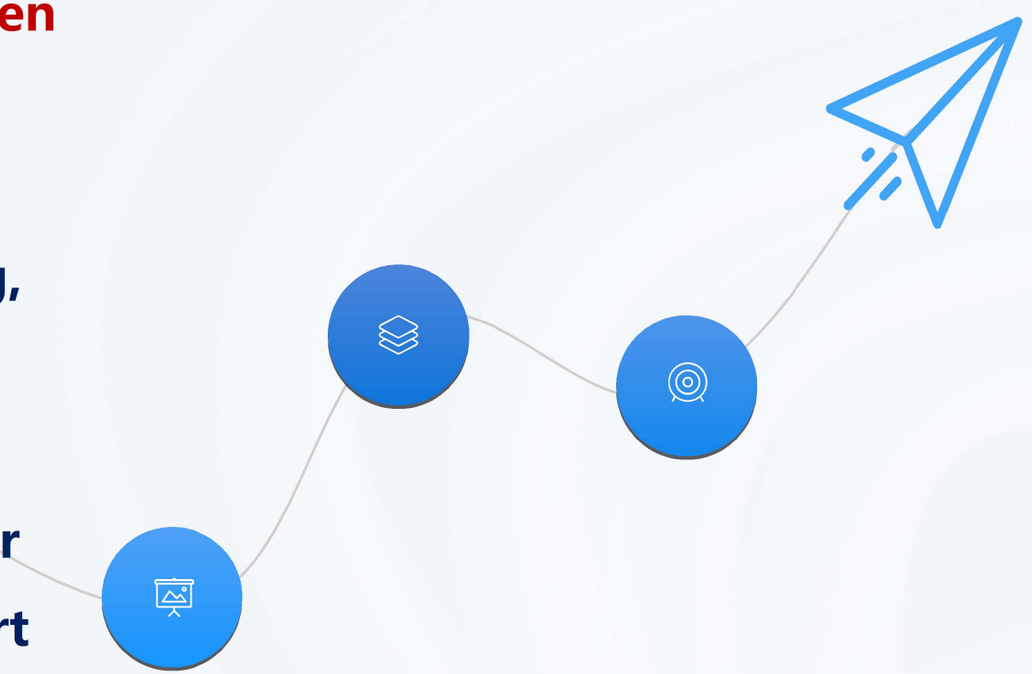
05 Inspiration and ideas on deepening the protection of ecological flow in river basins

Inspirations

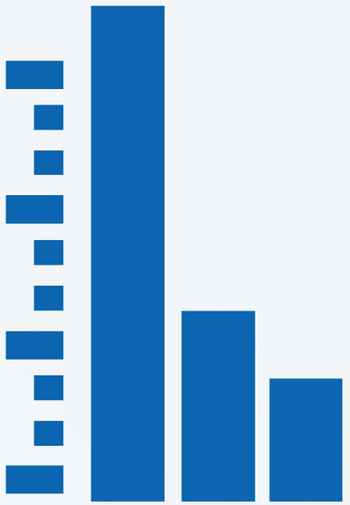
➢**the concept of harmonious coexistence between humans and nature.**

•Placing ecological flow as a fundamental and prerequisite position in water resource planning, allocation, and scheduling.

•Properly handle the dialectical relationship between water and river and lake ecology, water and economic and social development, and exert the rigid constraint effect of water resources.



Inspirations



➢**the overall concept of river basin.**

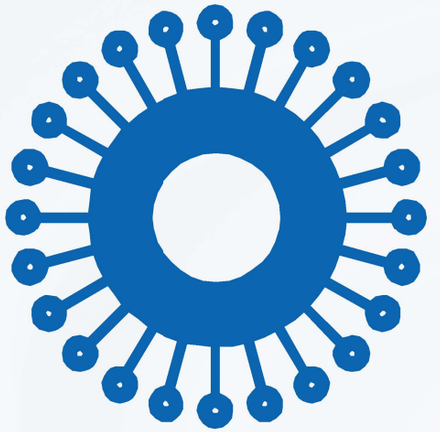
•Placing the protection of ecological flow as the top priority in the unified management of river basins.

•Coordinate the relationship between regions, departments, upstream and downstream, left and right banks, and expand from a single section guarantee to the overall guarantee of the basin.

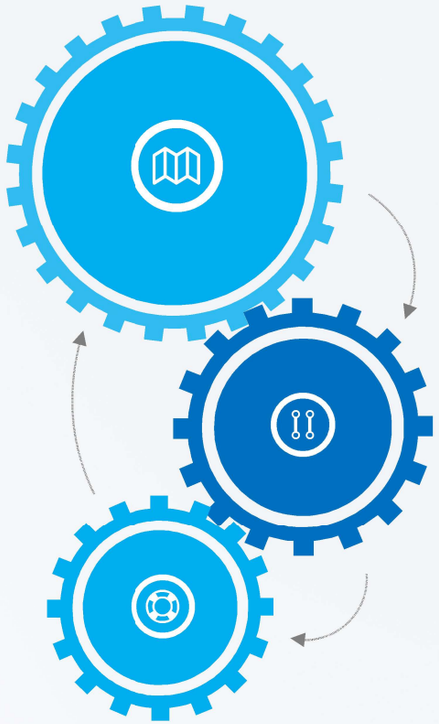
Inspirations

➢ **the systematic promotion of ecological flow guarantee work.**

- Create a complete work chain.
- Build a complete working mechanism.
- Strengthen top-level design and institutional supply.
- Consolidate the joint efforts of all parties.



Working assumptions



➢ **Establish and improve the target system for ensuring ecological flow (water level) in rivers and lakes**

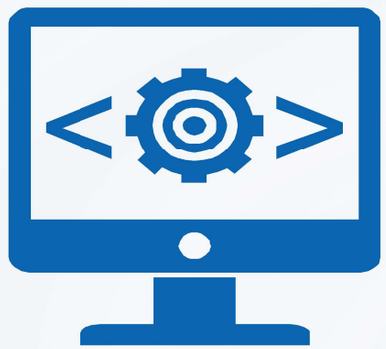
•Systematically ecological protection objects of rivers and lakes, and fully consider their ecological water demand

•Optimize the setting of control sections

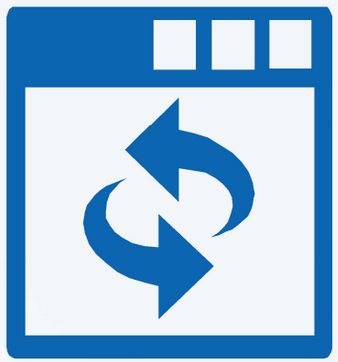
•Determine the ecological flow guarantee objectives of rivers and lakes by zoning and classification

Working assumptions

- **Systematically carry out hydrological, water resources, and ecological monitoring**
- Improve the network of ecological flow guarantee monitoring stations
- Enhancing ecological flow monitoring capabilities



Working assumptions



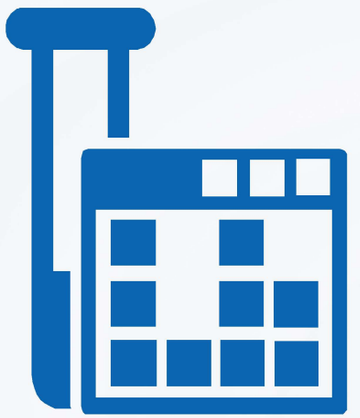
➢ **Scientifically carry out multi-objective integrated scheduling.**

- **Scientifically formulate water resources scheduling scheme.**
- **Strengthen the daily scheduling of ecological flow.**

Working assumptions

➢Reasonable control of water use.

- Incorporating ecological flow into the approval of important factors for water intake permits for construction projects.
- Establish and improve the list of water users ' control objects related to ecological flow protection.
- Strengthen emergency management and control measures for water intake.



Working assumptions

➢ **Strengthen the daily supervision of river and lake ecological flow (water level) .**

- **Formulate safeguard implementation plan according to local conditions.**
- **Strengthen the ' four pre ' capacity building.**
- **Scientifically carry out assessment and evaluation.**

■ Working assumptions

➢ **Establish and improve the ecological flow (water level) security management mechanism.**

- **Diversified long-term investment mechanism of the whole process and the whole chain.**
- **Authoritative and flexible target determination mechanism.**
- **Cross-regional and cross-sectoral ecological flow guarantee cooperation mechanism.**
- **Cross-regional and cross-sectoral ecological flow guarantee compensation mechanism.**

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THANKS !